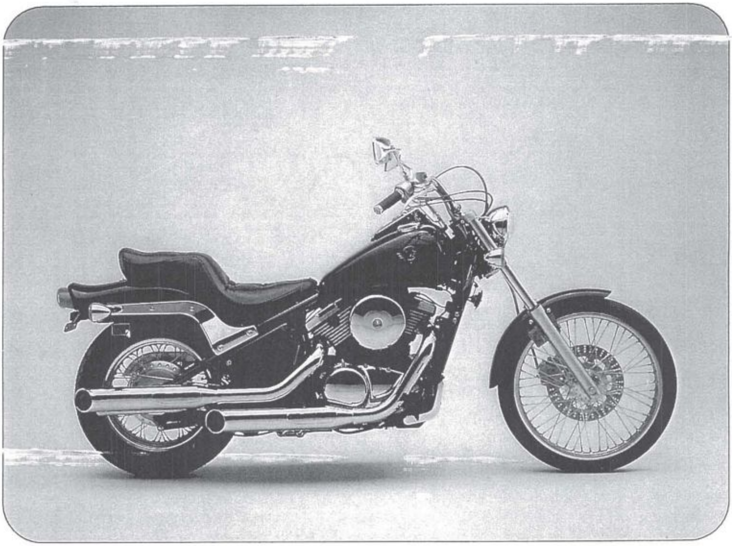
Kawasaki

VULCAN 800
VN800



95-04

Motorcycle
Service Manual

Quick Reference Guide

This quick reference guide will assist you in locating a desired topic or procedure.

- Bend the pages back to match the black tab of the desired chapter number with the black tab on the edge at each table of contents page.
- Refer to the sectional table of contents for the exact pages to locate the specific topic required.

VULCAN 800
VN800

Motorcycle Service Manual

LIST OF ABBREVIATIONS

A	ampere(s)	lb	pound(s)
ABDC	after bottom dead center	m	meter(s)
AC	alternating current	min	minute(s)
ATDC	after top dead center	N	newton(s)
BBDC	before bottom dead center	Pa	pascal(s)
BDC	bottom dead center	PS	horsepower
BTDC	before top dead center	psi	pound(s) per square inch
°C	degree(s) Celsius	r	revolution
DC	direct current	rpm	revolution(s) per minute
F	farad(s)	TDC	top dead center
°F	degree(s) Fahrenheit	TIR	total indicator reading
ft	foot, feet	V	volt(s)
g	gram(s)	W	watt(s)
h	hour(s)	Ω	ohm(s)
L	liter(s)		

Read OWNER'S MANUAL before operating.

EMISSION CONTROL INFORMATION

To protect the environment in which we all live, Kawasaki has incorporated crankcase emission (1) and exhaust emission (2) control systems in compliance with applicable regulations of the United States Environmental Protection Agency and California Air Resources Board. Additionally, Kawasaki has incorporated an evaporative emission control system (3) in compliance with applicable regulations of the California Air Resources Board on vehicles sold in California only.

1. Crankcase Emission Control System

   This system eliminates the release of crankcase vapors into the atmosphere. Instead, the vapors are routed through an oil separator to the intake side of the engine. While the engine is operating, the vapors are drawn into combustion chamber, where they are burned along with the fuel and air supplied by the carburetion system.

2. Exhaust Emission Control System

   This system reduces the amount of pollutants discharged into the atmosphere by the exhaust of this motorcycle. The fuel and ignition systems of this motorcycle have been carefully designed and constructed to ensure an efficient engine with low exhaust pollutant levels.

3. Evaporative Emission Control System

   Vapors caused by fuel evaporation in the fuel system are not vented into the atmosphere. Instead, fuel vapors are routed into the running engine to be burned, or stored in a canister when the engine is stopped. Liquid fuel is caught by a vapor separator and returned to the fuel tank.

The Clean Air Act, which is the Federal law covering motor vehicle pollution, contains what is commonly referred to as the Act's "tampering provisions."

"Sec. 203(a) The following acts and the causing thereof are prohibited...

(3)(A) for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title prior to its sale and delivery to the ultimate purchaser, or for any manufacturer or dealer knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser.

(3)(B) for any person engaged in the business of repairing, servicing, selling, leasing, or trading motor vehicles or motor vehicle engines, or who operates a fleet of motor vehicles knowingly to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title following its sale and delivery to the ultimate purchaser..."

(Continued on next page.)

NOTE

- *The phrase "remove or render inoperative any device or element of design" has been generally interpreted as follows:*
  1. *Tampering does not include the temporary removal or rendering inoperative of devices or elements of design in order to perform maintenance.*
  2. *Tampering could include:*
     - a. *Maladjustment of vehicle components such that the emission standards are exceeded.*
     - b. *Use of replacement parts or accessories which adversely affect the performance or durability of the motorcycle.*
     - c. *Addition of components or accessories that result in the vehicle exceeding the standards.*
     - d. *Permanently removing, disconnecting, or rendering inoperative any component or element of design of the emission control systems.*

WE RECOMMEND THAT ALL DEALERS OBSERVE THESE PROVISIONS OF FEDERAL LAW, THE VIOLATION OF WHICH IS PUNISHABLE BY CIVIL PENALTIES NOT EXCEEDING $10,000 PER VIOLATION.

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering are the acts listed below:

- Replacement of the original exhaust system or muffler with a component not in compliance with Federal regulations.
- Removal of the muffler(s) or any internal portion of the muffler(s).
- Removal of the air box or air box cover.
- Modifications to the muffler(s) or air intake system by cutting, drilling, or other means if such modifications result in increased noise levels.

Foreword

This manual is designed primarily for use by trained mechanics in a properly equipped shop. However, it contains enough detail and basic information to make it useful to the owner who desires to perform his own basic maintenance and repair work. A basic knowledge of mechanics, the proper use of tools, and workshop procedures must be understood in order to carry out maintenance and repair satisfactorily. Whenever the owner has insufficient experience or doubts his ability to do the work, all adjustments, maintenance, and repair should be carried out only by qualified mechanics.

In order to perform the work efficiently and to avoid costly mistakes, read the text, thoroughly familiarize yourself with the procedures before starting work, and then do the work carefully in a clean area. Whenever special tools or equipment are specified, do not use makeshift tools or equipment. Precision measurements can only be made if the proper instruments are used, and the use of substitute tools may adversely affect safe operation.

For the duration of the warranty period, we recommend that all repairs and scheduled maintenance be performed in accordance with this service manual. Any owner maintenance or repair procedure not performed in accordance with this manual may void the warranty.

To get the longest life out of your vehicle:

- Follow the Periodic Maintenance Chart in the Service Manual.
- Be alert for problems and non-scheduled maintenance.
- Use proper tools and genuine Kawasaki Motorcycle parts. Special tools, gauges, and testers that are necessary when servicing Kawasaki motorcycles are introduced by the Special Tool Catalog or Manual. Genuine parts provided as spare parts are listed in the Parts Catalog.
- Follow the procedures in this manual carefully. Don't take shortcuts.
- Remember to keep complete records of maintenance and repair with dates and any new parts installed.

How to Use This Manual

In this manual, the product is divited into its major systems and these systems make up the manual's chapters. The Quick Reference Guide shows you all of the product's system and assists in locating their chapters. Each chapter in turn has its own comprehensive Table of Contents.

For example, if you want ignition coil information, use the Quick Reference Guide to locate the Electrical System chapter. Then, use the Table of Contents on the first page of the chapter to find the Ignition Coil section.

Whenever you see these WARNING and CAUTION symbols, heed their instructions! Always follow safe operating and maintenance practices.

⚠ WARNING

This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.

CAUTION

This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

This manual contains four more symbols (in addition to WARNING and CAUTION) which will help you distinguish different types of information.

NOTE

○ *This note symbol indicates points of particular interest for more efficient and convenient operation.*

- ● Indicates a procedural step or work to be done.
- ○ Indicates a procedural sub-step or how to do the work of the procedural step it follows. It also precedes the text of a NOTE.
- ★ Indicates a conditional step or what action to take based on the results of the test or inspection in the procedural step or sub-step it follows.

In most chapters an exploded view illustration of the system components follows the Table of Contents. In these illustrations you will find the instructions indicating which parts require specified tightening torque, oil, grease or a locking agent during assembly.

General Information

1

Table of Contents

Before Servicing

Before starting to perform an inspection service or carry out a disassembly and reassembly operation on a motorcycle, read the precautions given below. To facilitate actual operations, notes, illustrations, photographs, cautions, and detailed descriptions have been included in each chapter wherever necessary. This section explains the items that require particular attention during the removal and reinstallation or disassembly and reassembly of general parts.

Especially note the following:

(1) Dirt

Before removal and disassembly, clean the motorcycle. Any dirt entering the engine will shorten the life of the motorcycle. For the same reason, before installing a new part, clean off any dust or metal filings.

(2) Battery Ground

Disconnect the ground (–) wire from the battery before performing any disassembly operations on the motorcycle. This prevents the engine from accidentally turning over while work is being carried out, sparks from being generated while disconnecting the wires from electrical parts, as well as damage to the electrical parts themselves. For reinstallation, first connect the positive wire to the positive (+) terminal of the battery

(3) Installation, Assembly

Generally, installation or assembly is the reverse of removal or disassembly. However, if installation or assembly sequence is given in this Service Manual, follow it. Note parts locations and cable, wire, and hose routing during removal or disassembly so they can be installed or assembled in the same way. It is preferable to mark and record the locations and routing whenever possible.

(4) Tightening Sequence

When installing bolts, nuts, or screws for which a tightening sequence is given in this Service Manual, make sure to follow the sequence. When installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit, thus ensuring that the part has been installed in its proper location. Then, tighten them to the specified torque in the tightening sequence and method indicated. If tightening sequence instructions are not given, tighten them evenly in a cross pattern. Conversely, to remove a part, first loosen all the bolts, nuts, or screws that are retaining the part a 1/4-turn before removing them.

(5) Torque

When torque values are given in this Service Manual, use them. Either too little or too much torque may lead to serious damage. Use a good quality, reliable torque wrench.

(6) Force

Common sense should dictate how much force is necessary in assembly and disassembly. If a part seems especially difficult to remove or install, stop and examine what may be causing the problem. Whenever tapping is necessary, tap lightly using a wooden or plastic-faced mallet. Use an impact driver for screws (particularly for the removing screws held by non-permanent locking agent) in order to avoid damaging the screw heads.

(7) Edges

Watch for sharp edges, as they could cause injury through careless handling, especially during major engine disassembly and assembly. Use a clean piece of thick cloth when lifting the engine or turning it over.

(8) High-Flash Point Solvent

A high-flash point solvent is recommended to reduce fire danger. A commercial solvent commonly available in North America is standard solvent (generic name). Always follow manufacturer and container directions regarding the use of any solvent.

(9) Gasket, O-Ring

Replace a gasket or an O-ring with a new part when disassembling. Remove any foreign matter from the mating surface of the gasket or O-ring to ensure a perfectly smooth surface to prevent oil or compression leaks.

(10) Liquid Gasket, Locking Agent

Clean and prepare surfaces where liquid gasket or non-permanent locking agent will be used. Apply them sparingly. Excessive amount may block engine oil passages and cause serious damage.

Before Servicing

(11) Press

When using a press or driver to install a part such as a wheel bearing, apply a small amount of oil to the area where the two parts come in contact to ensure a smooth fit.

(12) Ball Bearing and Needle Bearing

Do not remove a ball bearing or a needle bearing unless it is absolutely necessary. Replace any ball or needle bearings that were removed with new ones. Install bearings with the manufacturer and size marks facing out, applying pressure evenly with a suitable driver. Apply force only to the end of the race that contacts the press fit portion, and press it evenly over the base component.

(13) Oil Seal and Grease Seal

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals. Oil or grease seals should be pressed into place using a suitable driver, applying a force uniformly to the end of seal until the face of the seal is even with the end of the hole, unless instructed otherwise. When pressing in an oil or grease seal which has manufacturer's marks, press it in with the marks facing out.

(14) Circlip, Retaining Ring, and Cotter Pin

When installing circlips and retaining rings, take care to compress or expand them only enough to install them and no more. Install the circlip with its chamfered side facing load side as well.

Replace any circlips, retaining rings, and cotter pins that were removed with new ones, as removal weakens and deforms them. If old ones are reused, they could become detached while the motorcycle is driven, leading to a major problem.

(15) Lubrication

Engine wear is generally at its maximum while the engine is warming up and before all the sliding surfaces have an adequate lubricative film. During assembly, make sure to apply oil to any sliding surface or bearing that has been cleaned. Old grease or dirty oil could have lost its lubricative quality and may contain foreign particles that act as abrasives; therefore, make sure to wipe it off and apply fresh grease or oil. Some oils and greases in particular should be used only in certain applications and may be harmful if used in an application for which they are not intended.

(16) Direction of Engine Rotation

To rotate the crankshaft manually, make sure to do so in the direction of positive rotation. Positive rotation is counterclockwise as viewed from the left side of the engine. To carry out proper adjustment, it is furthermore necessary to rotate the engine in the direction of positive rotation as well.

(17) Replacement Parts

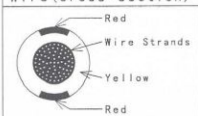
When there is a replacement instruction, replace these parts with new ones every time they are removed.

Replacement parts will be damaged or lose their original function once they are removed. Therefore, always replace these parts with new ones every time they are removed. Although the previously mentioned gasket, O-ring, ball bearing, needle bearing, grease seal, oil seal, circlip, and cotter pin have not been so designated in their respective text, they are replacement parts.

(18) Electrical Wires

All the electrical wires are either one-color or two-color. A two-color wire is identified first by the primary color and then the stripe color. For example, a yellow wire with thin red stripes is referred to as a "yellow/red" wire; it would be a "red/yellow" wire if the colors were reversed. Unless instructed otherwise, electrical wires must be connected to wires of the same color.

Two-Color Electrical

Wire (cross-section)	Color Indicated on the Wire	Color Indicated on the Wiring Diagram
	Yellow/Red	Y/R

G8020801W1 C

Before Servicing

(19)Inspection

When parts have been disassembled, visually inspect these parts for the following conditions or other damage. If there is any doubt as to the condition of them, replace them with new ones.

Abrasion	Crack	Hardening	Warp
Bent	Dent	Scratch	Wear
Color change	Deterioration	Seizure	

(20)Specifications

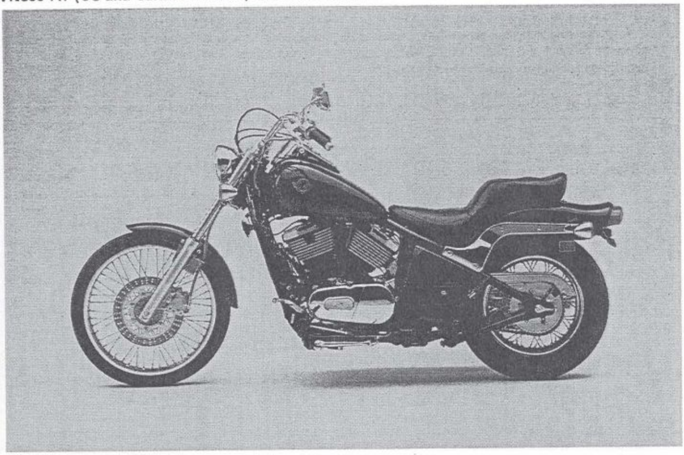
Specification terms are defined as follows:

"Standards" show dimensions or performances which brand-new parts or systems have.

"Service Limits" indicate the usable limits. If the measurement shows excessive wear or deteriorated performance, replace the damaged parts.

Model Identification

VN800-A1 (US and Canada Models) Left Side View:



VN800-A1 (US and Canada Models) Right Side View:

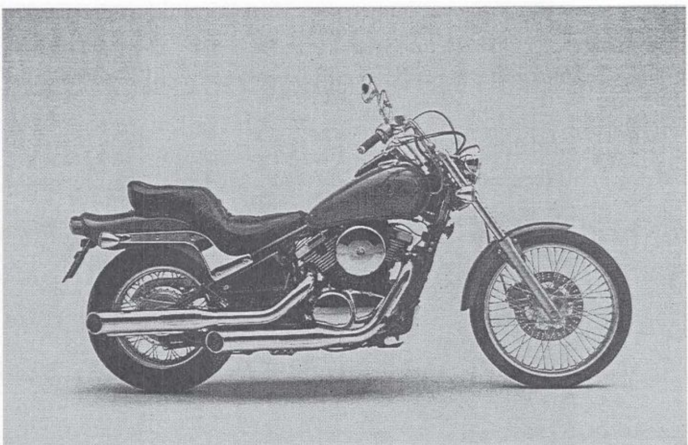


Model Identification

VN800-A1 (Europe Model) Left Side View:



VN800-A1 (Europe Model) Right Side View:



General Specifications

Items		VN800-A1, A2, A3, A4, A5	
Dimensions:			
Overall length		2 370 mm, (CN)(US) 2 360 mm	
Overall width		825 mm	
Overall height		1 170 mm	
Wheelbase		1 625 mm	
Road clearance		160 mm	
Seat height		710 mm	
Dry mass		225 kg, (CA) 225.5 kg	
Curb mass:	Front	107 kg	
	Rear	137 kg, (CA) 137.5 kg	
Fuel tank capacity		15.0 L	
Performance:			
Minimum turning radius		2.9 m	
Engine:			
Type		4-stroke, SOHC, V 2-cylinder	
Cooling system		Liquid-cooled	
Bore and stroke		88.0 x 66.2 mm	
Displacement		805 mL	
Compression ratio		9.5	
Maximum horsepower		40.5 kW (55 PS) @7 000 r/min (rpm), (CN) 44.1 kW (60 PS) @7 500 r/min (rpm), (ST) 24.2 kW (33 PS) @3 000 r/min(rpm), (FR) 39.3 kW (53 PS) @7 000 r/min (rpm) (UTAC's norm), (US) ---	
Maximum torque		64 N-m (6.5 kg-m, 47.0 ft-lb) @3 300 r/min(rpm), (CN) 64.7 N-m (6.6 kg-m, 47.7 ft-lb) @3 500 r/min (rpm), (ST) 55 N-m (5.6 kg-m, 40.5 ft-lb) @3 000 r/min (rpm), (FR)(UK)(US) ---	
Carburetion system		Carburetor, Keihin CVK 36	
Starting system		Electric starter	
Ignition system		Battery and coil (transistorized)	
Timing advance		Electronically advanced(digital igniter)	
Ignition timing		From 5.0° BTDC @1 000 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm)	
Spark plug		NGK CR7E or ND U22ESR-N	
Cylinder numbering method		Front to rear, 1-2	
Firing order		1-2	
Valve timing:			
Inlet	Open	22° BTDC,	A2 ~ 19° BTC
	Close	78° ABDC,	71° ABDC
	Duration	280°,	270°
Exhaust	Open	72° BBDC,	A2 ~ 69° BBDC
	Close	28° ATDC,	31° ATDC
	Duration	280°,	280°

General Specifications

Items		VN800-A1, A2	VN800-A3,A4,A5
Lubrication system		Forced lubrication (wet sump)	←
Engine oil:			
Grade		SE, SF or SG class	←
Viscosity		SAE10W-40, 10W-50, 20W-40, or 20W-50	←
Capacity		3.2 L	←
Drive Train:			
Primary reduction system:			
Type		Gear	←
Reduction ratio		2.184 (83/38)	←
Clutch type		Wet multi disc	←
Transmission:			
Type		5-speed, constant mesh, return shift	←
Gear ratios:	1st	2.250 (36/16)	2.533 (38/15)
	2nd	1.600 (32/20)	1.650 (33/20)
	3rd	1.230 (32/26)	1.230 (32/26)
	4th	1.000 (29/29)	1.000 (29/29)
	5th	0.857 (24/28)	0.857 (24/28)
Final drive system:			
Type		Chain drive	←
Reduction ratio		2.875 (46/16)	2.470 (42/17)
Overall drive ratio		5.382 @Top gear	4.625 @ Top gear
Frame:			
Type		Tubular, double cradle	←
Caster (rake angle)		34°	←
Trail		149 mm	←
Front tire:	Type	Tube	←
	Size	80/90-21 48H	←
Rear tire:	Type	Tube	←
	Size	140/90-16 71H	←
Front suspension:	Type	Telescopic fork	←
	Wheel travel	150 mm	←
Rear suspension:	Type	Swingarm (uni-trak)	←
	Wheel travel	100 mm	←
Brake Type:	Front	Single disc	←
	Rear	Drum	←
Electrical Equipment:			
Battery		12 V 12 Ah	←
Headlight:	Type	Semi-sealed beam	←
	Bulb	12 V 60/55 W (quartz-halogen)	←
Tail/brake light		12 V 5/21 W × 2, (CN) (US) 12 V 8/27 W × 2	←
Alternator:	Type	Three-phase AC	←
	Rated output	23.5 A/14 V @8 000 r/min (rpm)	←

Specifications subject to change without notice, and may not apply to every country.

(CA): California Model
(CN): Canada Model
(FR): France Model
(ST): Switzerland Model
(UK): U.K. Model
(US): U.S. Model

Periodic Maintenance Chart

The scheduled maintenance must be done in accordance with this chart to keep the motorcycle in good running condition. **The initial maintenance is vitally important and must not be neglected.**

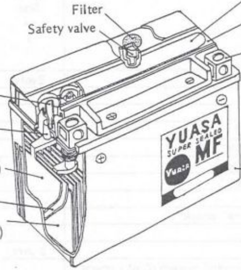
FREQUENCY / OPERATION	Whichever comes first → ↓ Every	† ODOMETER READING 800 km	5 000 km	10 000 km	15 000 km	20 000 km	25 000 km	30 000 km
Spark plug - clean			●	●	●	●	●	●
Spark plug - check*			●	●	●	●	●	●
Valve clearance check*				●		●		●
Air suction valve - check*			●	●	●	●	●	●
Air cleaner element - clean		●		●		●		●
Throttle grip play - check*		●		●		●		●
Idle speed - adjust*		●	●	●	●	●	●	●
Fuel hoses, connections - check*			●	●	●	●	●	●
Fuel system - check*				●		●		●
Coolant - change	2 yers							●
Evaporative emission control system (Cal) - check*		●	●	●	●	●	●	●
Engine oil - change	year	●	●	●	●	●	●	●
Oil filter - replace		●		●		●		●
Oil screen - clean		●		●		●		●
Radiator hoses, connections - check *	year	●		●		●		●
Fuel hose - replace	4 years							
Clutch - adjust		●	●	●	●	●	●	●
Drive chain wear - check *			●	●	●	●	●	●
Drive chain - lubricate	300 mm							
Drive chain slack - check*	800 km							
Brake lining or pad wear - check*			●	●	●	●	●	●
Brake fluid level - check*	month	●	●	●	●	●	●	●
Brake fluid - change	2 years					●		
Brake hoses, connections - check*			●	●	●	●	●	●
Brake hose - replace	4 year							
Brake master cylinder cup and dust seal - replace	2 years							
Caliper piston seal and dust seal - replace	2 years							
Brake play - check*		●	●	●	●	●	●	●
Brake light switch - check*		●	●	●	●	●	●	●
Brake camshaft - lubricate	2 years							
Brake cable - replace*	2 years							
Steering - check		●	●	●	●	●	●	●
Steering stem bearing - lubricate	2 years					●		
Front fork oil - change								●
Tire wear - check*			●	●	●	●	●	●
Spoke tightness and rim runout - check*		●	●	●	●	●	●	●
Swingarm pivot, uni-trak linkage - lubricate				●		●		●
General lubrication - perform			●	●	●	●	●	●
Nuts, bolts, and fastener tightness - check*		●		●		●		●

† : For higher odometer readings, repeat at the frequency interval established here.
* : Replace, add, adjust, clean, or torque if necessary.
(Cal) : California Model only

Technical Information - Sealed Battery

A sealed battery is installed in this model. The battery is a sealed type, and so cannot be performed the electrolyte level check and topping-up.

(I) Construction



(II) Main Features

1) Maintenance free.. It is not necessary to check the electrolyte level and top-up the electrolyte.
2) No electrolyte leakage................................ As the electrolyte is retained firmly in the special separators, there is no free electrolyte in the battery.
3) Instant activation system............................ It can be used instantly after filling only the electrolyte without initial charge.
4) One-push motion electrolyte filling........... It is possible to fill the electrolyte by easy one-push motion.
5) Safety construction .... If the battery internal pressure rises abnormally high, the safety valve opens to release the gas inside the battery to restore the normal pressure and prevent the battery from rupturing. After restoring the normal pressure, the safety valve closes and the battery is sealed again. Moreover, a ceramic filter is disposed on top of the safety valve under the lid to remove risk of ignition or explosion caused by fire from outside.
6) Compact and high performance................. No presence of free electrolyte allows the battery made lower in height, thus resulting in enhanced volume efficiency. Moreover, gas being absorbed inside the battery eliminates the need for a gas exhaust tube.
7) Strong charge/discharge characteristics .... It can amply withstand deep charge/discharge cycles.

(III) Principle of Sealing Structure

A lead-acid battery operates under the following chemical reaction:

(+)				(−)	Discharge	(+)				(−)
PbO_2	+	$2H_2SO_4$	+	Pb	$\rightleftarrows$	$PbSO_4$	+	$2H_2O$	+	$PbSO_4$
(Lead peroxide) Positive active material		(Sulfuric acid) Electrolyte		(Spongy lead) Negative active material	Charge	(Lead sulfate) Positive active material		(water) Electrolyte		(Lead sulfate) Negative active material

Normally in an ordinary lead-acid battery when it comes to an end of a charge, where the lead sulfate being a discharge product returns to lead peroxide and spongy lead, the charge current flowing thereafter is used exclusively to decompose electrolytically water from the electrolyte, thus resulting in generation of hydrogen gas from the negative plate and oxygen gas from the positive plate. The gases so generated are released out of the battery, causing the amount of electrolyte decreased to require occasional water replenishment.

A maintenance free battery, however, is so designed that, when it is overcharged, even if the positive plate is fully charged, the negative plate remains not fully turned to spongy lead. Therefore, even when the positive plate is overcharged generating oxygen gas, the negative plate is no fully charged, hence generating no hydrogen gas.

Moreover, the oxygen gas generated from the positive plate immediately reacts with the charged active material on the negative plate, and returns to water, with the ultimate result of no water loss.

Technical Information - Sealed Battery

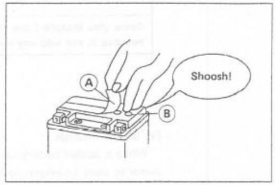
Pb	+	$1/2\ O_2$	→	(PbO)			
Negative active material (charged state)		Oxygen generated from positive plate		Negative active material			
(PbO)	+	H_2SO_4	→	$PbSO_4$	+	H_2O	
		Electrolyte		Negative active material (charged state)		Water	

Thus, the negative plate is made as not to get fully charged. Even if the overcharge continues, the oxygen gas generated inside the battery is absorbed by the negative plate, a process called oxygen cycle, which keeps water loss theoretically at nil, and allows the battery to be sealed.

(IV) Filling the Battery with Electrolyte

CAUTION

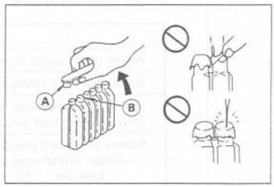
Do not remove the aluminum seal sheet sealing the filler ports until just before use.
Be sure to use the dedicated electrolyte container for correct electrolyte volume.



- Check to see that there is no peeling, tears or holes in the sealing sheet.
- Place the battery on a level surface.
- Remove the sealing sheet [A].
- ○ When removing, check to hear an air-sucking sound "Shoosh!" from filler ports [B].

NOTE

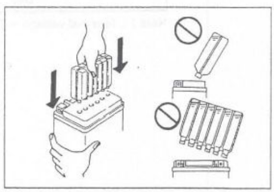
○ *A battery whose sealing sheet has any peeling, tears, holes, or from which the air-sucking sound was not heard requires a refreshing charge (initial charge).*



- Take the electrolyte container out of the vinyl bag.
- Detach the strip of caps [A] from the container.

NOTE

○ *Do not discard the strip of caps because it is used as the battery plugs later.*
○ *Do not peel back or pierce the sealed areas [B].*

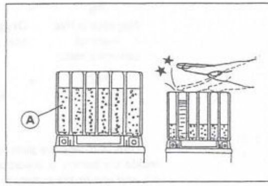


- Place the electrolyte container upside down with the six sealed areas in line with the six battery filler ports.
- Push the container down strongly enough to break the seals. Now the electrolyte should start to flow into the battery.

NOTE

○ *Do not tilt the container as the electrolyte flow may be interrupted.*

Technical Information - Sealed Battery

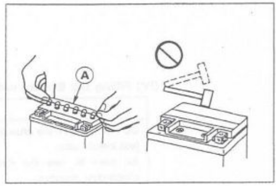


- Make sure air bubbles [A] are coming up from all six filler ports.
- ○ Leave the container this way for 5 minutes or longer.

NOTE

○ If no air bubbles are coming up from a filler port, tap the bottom of the bottle two or three times. Never remove the container from the battery.

CAUTION
Fill until the container is completely emptied.



- Be certain that all the electrolyte has flowed out.
- Tap the bottom the same way as above if there is any electrolyte left in the container.
- Now pull the container gently out of the battery.
- Let the battery sit for **20** minutes. During this time, the electrolyte permeates the special separators and the gas generated by chemical reaction is released.
- Fit the strip of caps [A] tightly into the filler ports until the strip is at the same level as the top of the battery.

NOTE

○ Do not hammer. Press down evenly with both hands.

CAUTION
Once you installed the strip of caps after filling the battery, never remove it, nor add any water or electrolyte.

(V) Initial Change

While a sealed battery can be used after only filling with electrolyte, a battery may not be able to sufficiently move a starter motor to start an engine in the cases shown in the table below, where an initial change is required before use. However, if a battery shows a terminal voltage of higher than 12.6 V after 10 minutes of filling (Note 1), no initial change is necessary.

Condition requiring initial charge	Charging method
At low temperatures (lower than 0°C)	1.4 A × 2 ~ 3 hours
Battery has been stored in high temperature and humidity.	1.4 A × 15 ~ 20 hours
Seal has been removed, or broken − peeling, tear or hole. (If you did not hear the air-sucking sound "Shoosh!" as you removed the seal.)	
Battery as old as 2 years or more after manufacture. Battery manufacturing date is printed on battery top. Example) 12 (Day) 10 (Month) 93 (Year) T1 (Mfg. location)	

Note 1 : Terminal voltage − To measure battery terminal voltage, use a digital voltmeter.

Technical Information - Sealed Battery

(VI) Precautions

1) No need of topping-up
   No topping-up is necessary in this battery until it ends its life under normal use. Forcibly prying off the sealing plug to add water is very dangerous. Never do that.
2) Refreshing charge
   If an engine will not start, a horn sounds weak, or lamps are dim, it indicates the battery has been discharged. Give refresh charge for 5 to 10 hours with charge current shown in the specification (see the Electrical System chapter).
   When a fast charge is inevitably required, do it following precisely the maximum charge current and time conditions indicated on the battery.

CAUTION

This battery is designed to sustain no unusual deterioration if refresh-charged according to the method specified above. However, the battery's performance may be reduced noticeably if charged under conditions other than given above. Never remove the sealing plug during refresh charge.
If by chance an excessive amount of gas is generated due to overcharging, the safety valve operates to keep the battery safe.

3) When you do not use the motorcycle for months
   Give a refresh charge before you store the motorcycle and store it with the negative lead removed. Give a refresh charge once a month during storage.
4) Battery life
   If the battery will not start the engine even after several refresh charges, the battery has exceeded its useful life. Replace it. (Provided, however, the vehicle's starting system has no problem.)

⚠WARNING

Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.
No fire should be drawn near the battery, or no terminals should have the tightening loosened.
The electrolyte contains sulfuric acid. Be careful not to have it touch your skin or eyes. If touched, wash it off with liberal amount of water. Get medical attention if severe.

(VII) Interchangeability with Ordinary Battery

A sealed battery can fully display its performance only when combined with a proper vehicle electric system. Therefore, replace a sealed battery only on a motorcycle which was originally equipped with a sealed battery.

Be careful, if a sealed battery is installed on a motorcycle which had an ordinary battery as original equipment, the sealed battery's life will be shortened.

Torque and Locking Agent

The following tables list the tightening torque for the major fasteners requiring use of a non-permanent locking agent or liquid gasket.

Letters used in the "Remarks" column mean:
- L: Apply a non-permanent locking agent to the threads.
- O: Apply an oil to the threads, seated surface, or washer.
- S: Tighten the fasteners following the specified sequence.
- SS: Apply silicone sealant.

Fastener	Torque			Remarks
	N·m	kg·m	ft·lb	
Fuel System:				
Carburetor damper plate mounting bolts	11	1.1	95 in·lb	
Air cleaner element cover mounting nut	11	1.1	95 in·lb	
Air cleaner housing mounting bolts	11	1.1	95 in·lb	
Cooling System				
Water pump impeller nut	11	1.1	95 in·lb	
Water hose fitting bolts	11	1.1	95 in·lb	
Radiator fan switch	18	1.8	13.0	SS
Water temperature sensor	7.8	0.80	69 in·lb	SS
Coolant drain plug	11	1.1	95 in·lb	
Engine Top End:				
Cylinder head cover bolts	12	1.2	104 in·lb	
Cylinder head nuts: 10 mm	39	4.0	29	S
8 mm	25	2.5	18.0	S
Cylinder head bolts	12	1.2	104 in·lb	S
Cylinder nuts	25	2.5	18.0	
Camshaft cap bolts	25	2.5	18.0	
Camshaft sprocket bolts	49	5.0	36	L
Camshaft chain tensioner cap bolts	20	2.0	14.5	
Camshaft chain guide bolts	11	1.1	95 in·lb	L
Intake manifold bolts	12	1.2	104 in·lb	
Cylinder head cover damper plate bolts	12	1.2	104 in·lb	L, S
Clutch:				
Clutch hub nut	132	13.5	98	O
Clutch spring bolts	8.8	0.90	78 in·lb	
Right engine cover bolts	12	1.2	104 in·lb	L (1)
Engine Lubrication System:				
Engine drain plug	20	2.0	14.5	
Oil pump mounting bolts	11	1.1	95 in·lb	L
Oil pump drive chain guide bolt	12	1.2	104 in·lb	L
Oil filter	18	1.8	13.0	
Oil filter plate mounting bolts	7.8	0.80	69 in·lb	
Oil screen plug	20	2.0	14.5	
Oil pressure relief valve	15	1.5	11.0	L
Oil pressure switch	15	1.5	11.0	SS
Oil pressure switch adapter	20	2.0	14.5	
Oil pipe mounting bolts (crankcase inside)	11	1.1	95 in·lb	L
Oil pipe mounting bolts (crankcase outside)	5.4	0.55	48 in·lb	L
Oil passage cover screw (crankcase inside)	5.4	0.55	48 in·lb	L

Torque and Locking Agent

Engine Removal/Installation:					
Engine mounting nuts		44	4.5	33	
Engine mounting bracket bolts		23	2.3	16.5	
Down tube mounting bolts		44	4.5	33	
Crankshaft/Transmission:					
Crankcase bolts:	10 mm	39	4.0	29	S
	6 mm	11	1.1	95 in·lb	
Connecting rod big end cap nuts		46	4.7	34	
Primary gear bolt		157	16.0	115	O
Balancer gear bolt		69	7.0	51	L
Starter clutch gear bolt		69	7.0	51	L
Starter clutch bolts		34	3.5	25	L
Output shaft bearing stopper bolts		12	1.2	104 in·lb	
Balancer shaft bearing stopper bolts		11	1.1	95 in·lb	
Shift drum bearing stopper bolts		11	1.1	95 in·lb	
Transmission cover bolts		11	1.1	95 in·lb	
External shift mechanism cover bolts		11	1.1	95 in·lb	
Shift shaft return spring pin		29	3.0	22	L
Shift drum position lever bolt		11	1.1	95 in·lb	
Neutral switch		15	1.5	11.0	
Shift pedal pivot bolt		29	3.0	22	
Shift pedal pivot nut		29	3.0	22	
Shift drum cam mounting screw		–	–	–	L
Shift lever camp bolt		12	1.2	104 in·lb	
Wheels/Tires:					
Front axle clamp bolt		34	3.5	25	
Front axle nut		88	9.0	65	
Rear axle nut		98	10.0	72	
Spoke nipples		4.0	0.41	36 in·lb	
Final Drive:					
Engine sprocket nut		127	13.0	94	O
Rear sprocket nuts		74	7.5	54	
Rear sprocket stud bolts		–	–	–	L
Brakes:					
Torque link nuts		34	3.5	25	
Caliper mounting bolts		34	35.	25	
Disk mounting bolts		23	2.3	16.5	
Brake hose banjo bolts		25	2.5	18.0	
Bleed valve		7.8	0.80	69 in·lb	
Brake pedal bolt		23	2.3	16.5	
Master cylinder clamp bolts		11	1.1	95 in·lb	
Brake lever pivot bolt		1.0	0.10	9 in·lb	
Brake lever pivot nut		5.9	0.60	52 in·lb	
Reservoir cap screw		1.5	0.15	13 in·lb	
Front brake light switch screws		1.2	0.12	10 in·lb	
Suspension:					
Front fork clamp bolts:	upper	20	2.0	14.5	
	lower	34	3.5	25	
Front fork bottom Allen bolts		20	2.0	14.5	L
Rear shock absorber nuts		59	6.0	43	
Swingarm pivot shaft nut		98	10.0	72	

Torque and Locking Agent

Rocker arm pivot shaft nut	98	10.0	72	
Tie-rod nuts	59	6.0	43	
Steering:				
Handlebar clamp bolts	34	3.5	25	
Handlebar holder mounting nuts	34	3.5	25	
Handlebar weight mounting screws	–	–	–	L
Steering stem head bolt	44	4.5	33	
Steering stem nut	4.9	0.50	43 in·lb	
Frame:				
Rear frame mounting bolts	44	4.5	33	
Side stand pivot bolt	44	4.5	33	
Helmet hook mounting screw	–	–	–	L
Electrical System:				
Alternator cover bolts	12	1.2	104 in·lb	L (1)
Timing inspection cover screw	4.9	0.50	43 in·lb	
Alternator rotor bolt	157	16.0	115	O
Stator coil bolts	13	1.3	113 in·lb	
Pickup coil bolts	2.9	0.30	26 in·lb	
Alternator lead clamp bolts	7.8	0.80	69 in·lb	
Spark plugs	18	1.8	13.0	
Starter motor mounting bolts	11	1.1	95 in·lb	
Starter motor through bolts	4.9	0.50	43 in·lb	
Starter motor terminal nut	11	1.1	95 in·lb	
Starter motor cable nuts	4.9	0.50	43 in·lb	
Side stand switch mounting bolts	3.9	0.40	35 in·lb	L

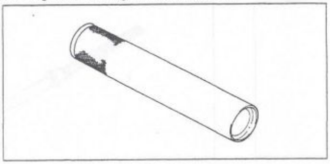
The table, reading tightening torque to thread diameter, lists the basic torque for the bolts and nuts. Use this table for only the bolts and nuts which do not require a specific torque value. All of the values are for use with dry solvent-cleaned threads.

Basic Torque for General Fasteners of Frame Parts

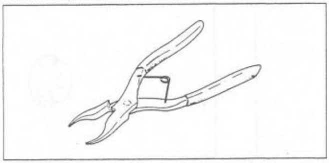
Threads dia.	Torque		
mm	N·m	kg·m	ft·lb
5	3.4 ~ 4.9	0.35 ~ 0.50	30 ~ 43 in·lb
6	5.9 ~ 7.8	0.60 ~ 0.80	52 ~ 69 in·lb
8	14 ~ 19	1.4 ~ 1.9	10.0 ~ 13.5
10	25 ~ 34	2.6 ~ 3.5	19 ~ 25
12	44 ~ 61	4.5 ~ 6.2	33 ~ 45
14	73 ~ 98	7.4 ~ 10.0	54 ~ 72
16	115 ~ 155	11.5 ~ 16.0	83 ~ 115
18	165 ~ 225	17 ~ 23	125 ~ 165
20	225 ~ 325	23 ~ 33	165 ~ 240

Special Tools and Sealant

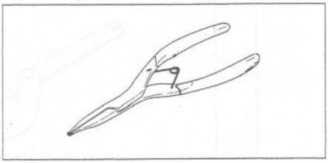
Steering Stem Bearing Driver: 57001-137



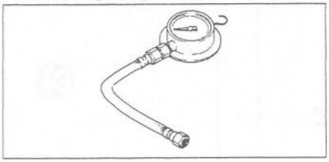
Inside Circlip Pliers: 57001-143



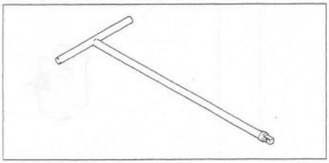
Outside Circlip Pliers: 57001-144



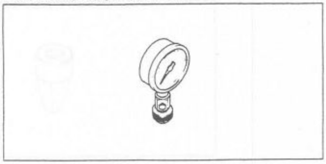
Oil Pressure Gauge, 10 kg/cm²: 57001-164



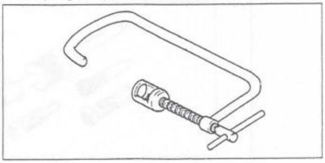
Fork Cylinder Holder Handle: 57001-183



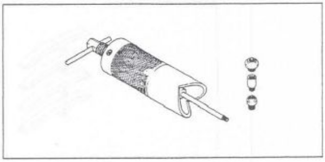
Compression Gauge: 57001-221



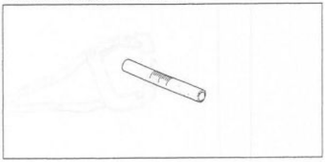
Valve Spring Compressor Assembly: 57001-241



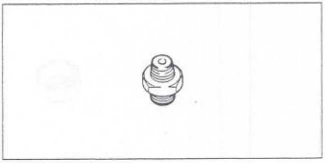
Piston Pin Puller Assembly: 57001-910



Fuel Level Gauge: 57001-1017

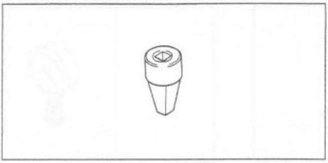


Oil Pressure Gauge Adapter, PT ⅛: 57001-1033

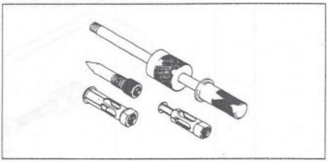


Special Tools and Sealant

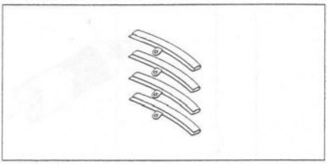
Fork Cylinder Holder Adapter: 57001-1057



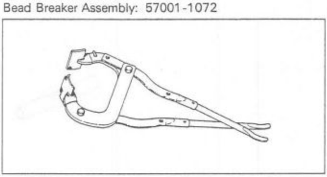
Oil Seal & Bearing Remover: 57001-1058



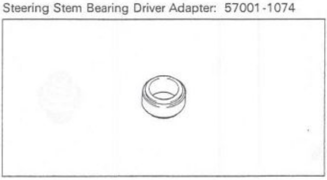
Rim Protector: 57001-1063



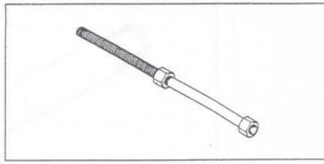
Bead Breaker Assembly: 57001-1072



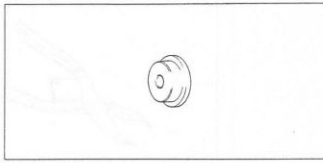
Steering Stem Bearing Driver Adapter: 57001-1074



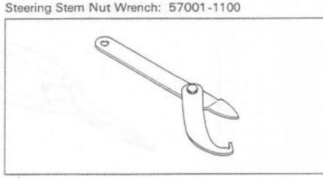
Head Pipe Outer Race Press Shaft: 57001-1075



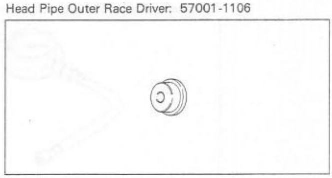
Head Pipe Outer Race Driver: 57001-1076



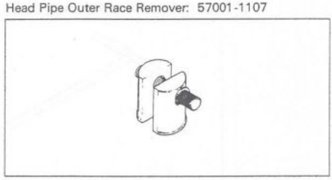
Steering Stem Nut Wrench: 57001-1100



Head Pipe Outer Race Driver: 57001-1106

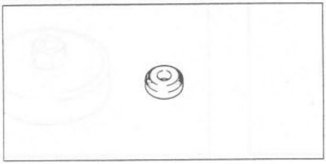


Head Pipe Outer Race Remover: 57001-1107

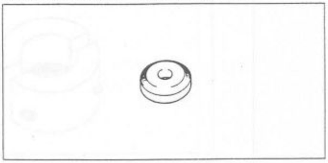


Special Tools and Sealant

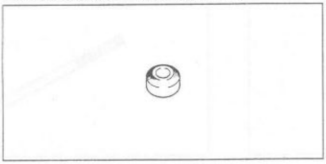
Valve Seat Cutter, 45° – Φ32: 57001-1115



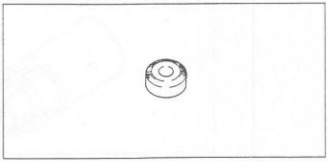
Valve Seat Cutter, 45° – Φ30: 57001-1187



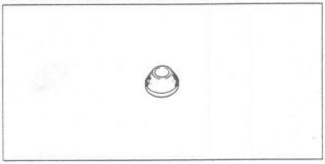
Valve Seat Cutter, 32° – Φ28: 57001-1119



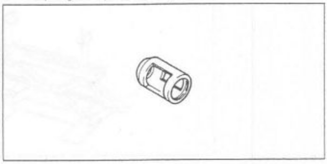
Valve Seat Cutter, 32° – Φ33: 57001-1199



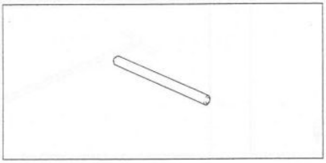
Valve Seat Cutter, 60° – Φ30: 57001-1123



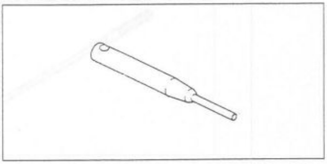
Valve Spring Compressor Adapter, Φ22: 57001-1202



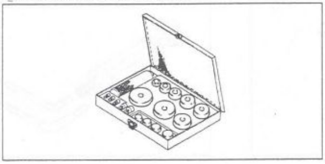
Valve Seat Cutter Holder Bar: 57001-1128



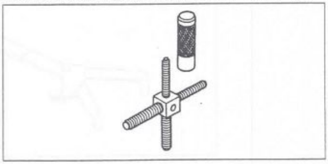
Valve Seat Cutter Holder, Φ5: 57001-1208



Bearing Driver Set: 57001-1129

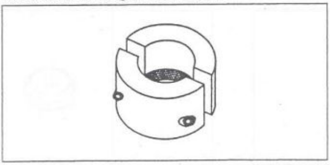


Rotor Puller, M16/M18/M20/M22 x 1.5: 57001-1216

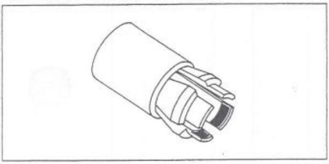


Special Tools and Sealant

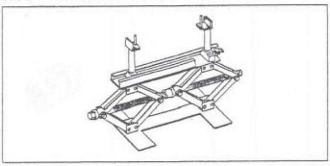
Fork Outer Tube Weight: 57001-1218



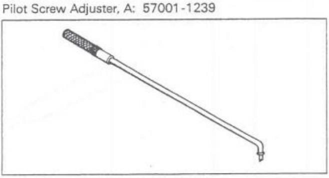
Front Fork Oil Seal Driver: 57001-1219



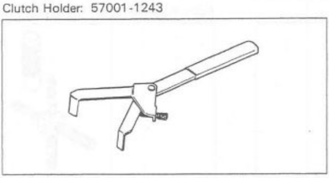
Jack: 57001-1238



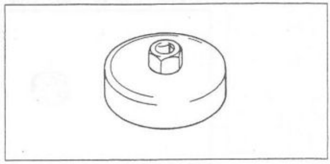
Pilot Screw Adjuster, A: 57001-1239



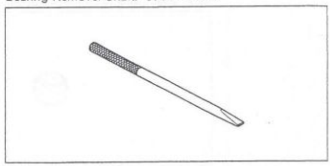
Clutch Holder: 57001-1243



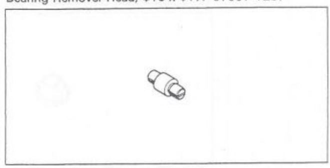
Oil Filter Wrench: 57001-1249



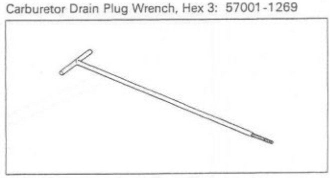
Bearing Remover Shaft: 57001-1265



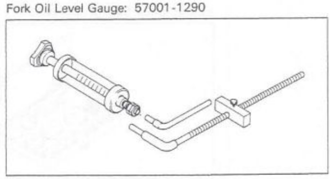
Bearing Remover Head, Φ15 x Φ17: 57001-1267



Carburetor Drain Plug Wrench, Hex 3: 57001-1269

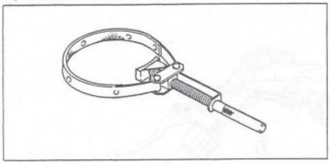


Fork Oil Level Gauge: 57001-1290

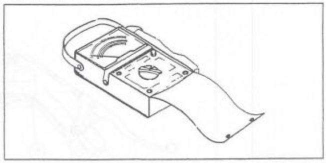


Special Tools and Sealant

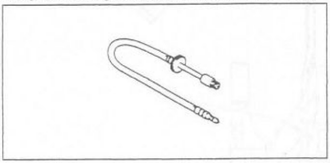
Flywheel Holder: 57001-1313



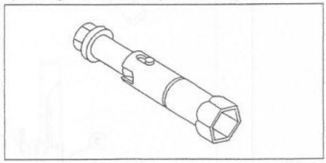
Hand Tester: 57001-1394



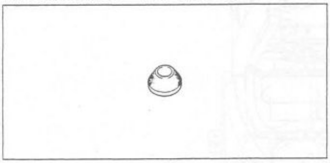
Compression Gauge Adapter, M10 X 1.0: 57001-1317



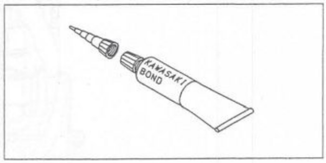
Spark Plug Wrench, 16mm (Owner's Tool): 92110-1132



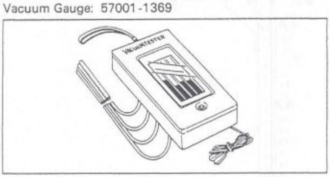
Valve Seat Cutter, 60° – Φ33: 57001-1334



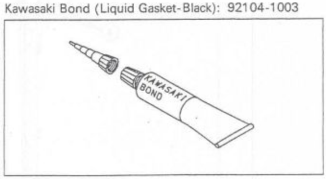
Kawasaki Bond (Silicone Sealant): 56019-120



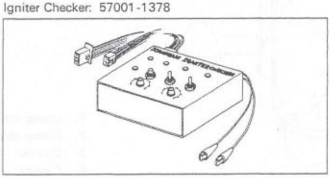
Vacuum Gauge: 57001-1369



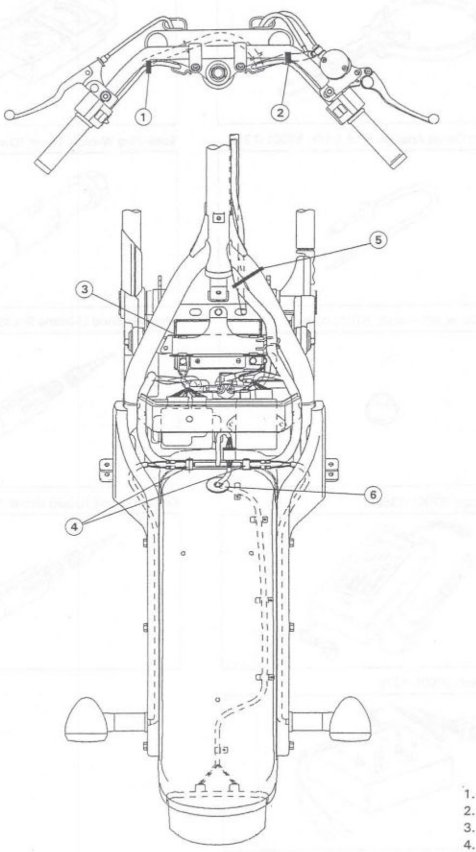
Kawasaki Bond (Liquid Gasket-Black): 92104-1003



Igniter Checker: 57001-1378



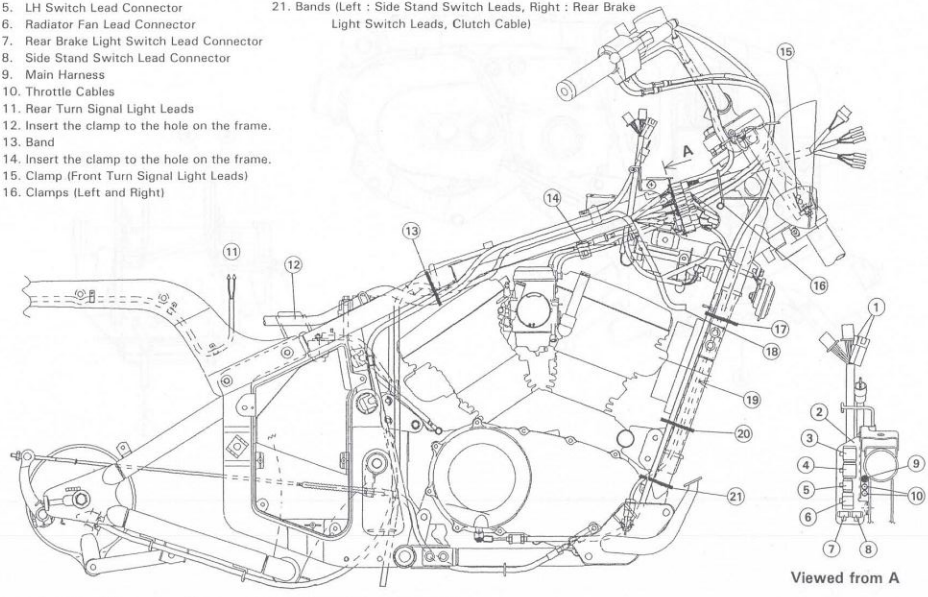
Cable, Wire, and Hose Routing



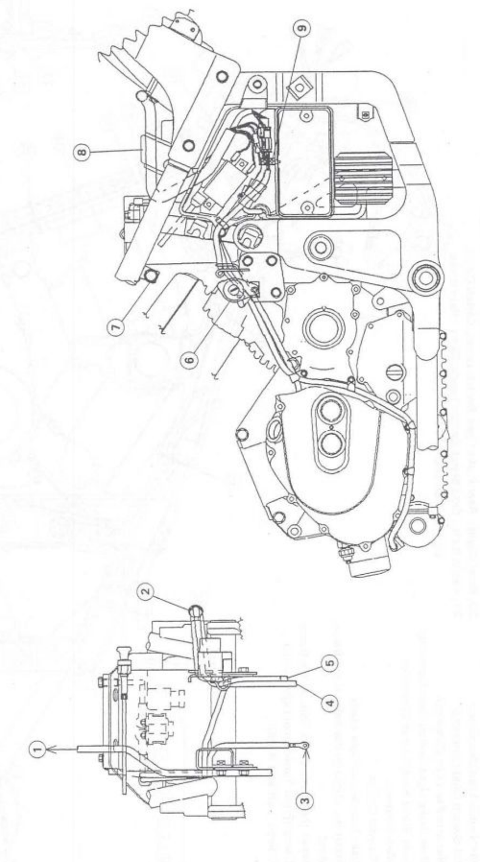
1. Clamp (LH Switch Leads)
2. Clamp (Brake Hose)
3. Damper
4. Clamps
5. Band
6. Grommet

Cable, Wire, and Hose Routing

1. Rectifiers
2. Bracket
3. LH Switch Lead Connector
4. RH Switch Lead Connector
5. LH Switch Lead Connector
6. Radiator Fan Lead Connector
7. Rear Brake Light Switch Lead Connector
8. Side Stand Switch Lead Connector
9. Main Harness
10. Throttle Cables
11. Rear Turn Signal Light Leads
12. Insert the clamp to the hole on the frame.
13. Band
14. Insert the clamp to the hole on the frame.
15. Clamp (Front Turn Signal Light Leads)
16. Clamps (Left and Right)
17. Bands (Left : Side Stand Switch Leads, Radiator Fan Leads, Right : Rear Brake Light Switch Leads)
18. Fuel Tank Drain Hose
19. Run the Leads between the frame and the radiator (Left and Right).
20. Band (Right : Rear Brake Light Switch Leads, Clutch Cable)
21. Bands (Left : Side Stand Switch Leads, Right : Rear Brake Light Switch Leads, Clutch Cable)

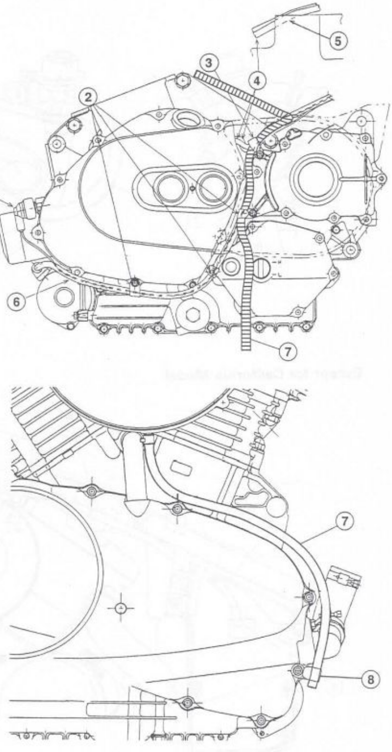


Cable, Wire, and Hose Routing



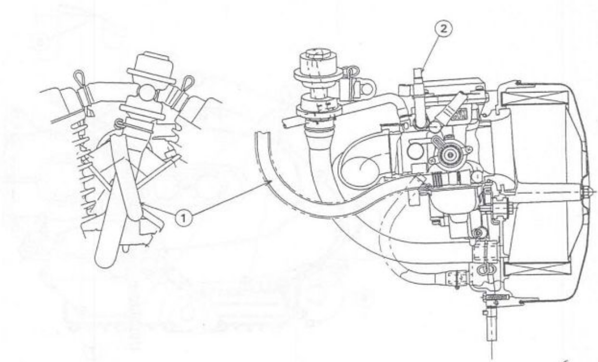
1. Fuel Tank Drain Hose
2. Clamp
3. Tighten the lead to the crankcase.
4. Starter Motor Lead
5. Alternator Leads
6. Ignition Switch
7. Choke Knob
8. Insert the clamp to the hole on the frame.
9. Clamp

Cable, Wire, and Hose Routing

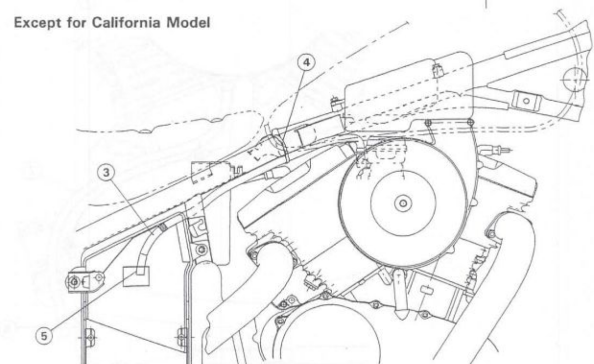


1. Direct the oil pressure switch lead to the downward.
   (Apply grease to the terminal.)
2. Clamps
3. Clamp
4. Alternator Leads, Pickup Coil Leads
5. Run the leads inside the drive chain cover.
6. Starter Motor Lead
7. Air Cleaner Drain Hose
8. Clamp

Cable, Wire, and Hose Routing



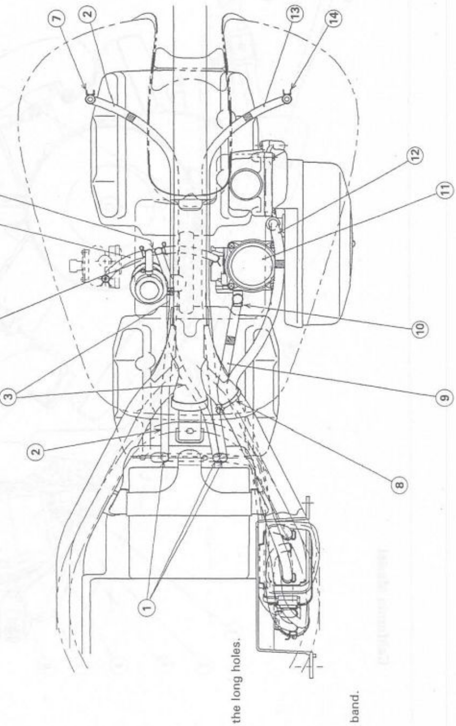
Except for California Model



1. Fuel Hose
2. Direct the choke cable to the upward.
   (Do not run the choke cable below the manifold.)
3. Hose (Green)
4. Do not overtighten the band.
5. Insert the hose end to the bracket.

Cable, Wire, and Hose Routing

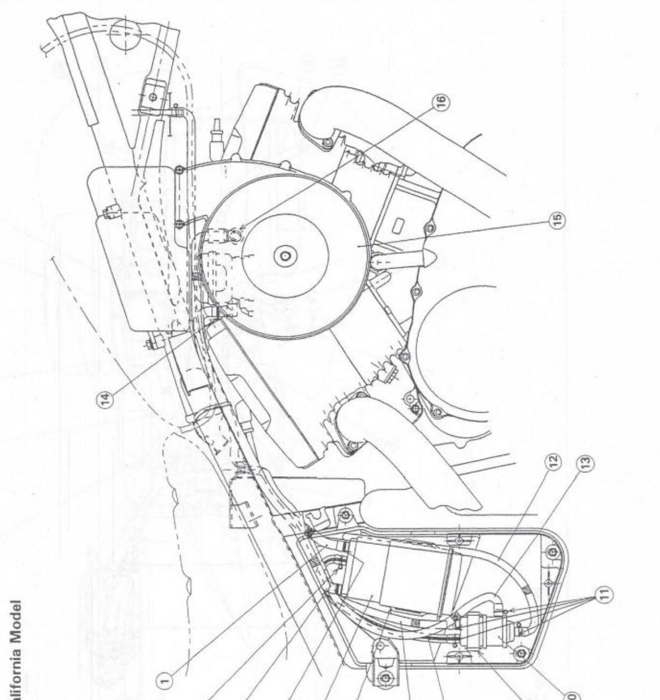
California Model



1. Run the hoses through the long holes.
2. Hose (Red)
3. Hose (White)
4. Clamps
5. Hoses
6. Fitting
7. Clamp
8. Do not overtighten the band.
9. Hose (Yellow)
10. Clamp
11. Carburetor
12. Hose (Green)
13. Hose (Blue)
14. Clamp

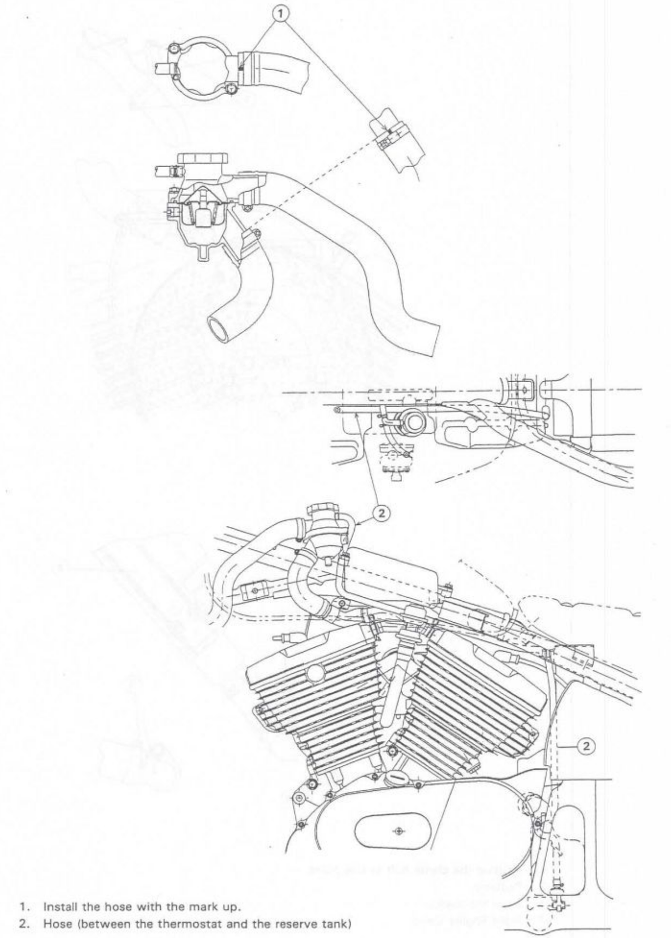
Cable, Wire, and Hose Routing

California Model



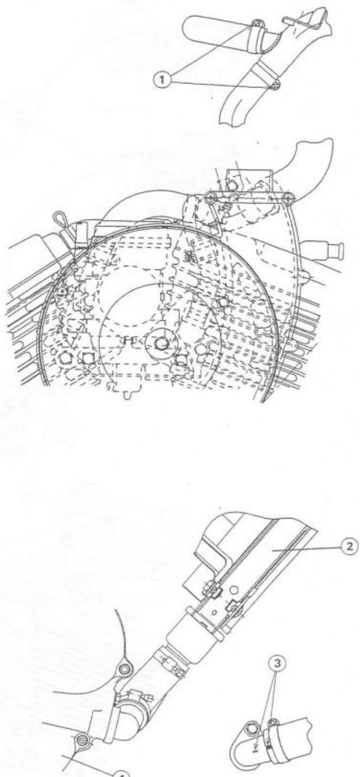
1. Hose (Green)
2. Clamp
3. Hose (Yellow)
4. Clamp
5. Canister
6. Holder
7. Hose (Blue)
8. Hose (Blue)
9. Band
10. Separator
11. Clamp
12. Hose (White)
13. Hose (Red)
14. Clamp
15. Air Cleaner Housing
16. Grommet

Cable, Wire, and Hose Routing



1. Install the hose with the mark up.
2. Hose (between the thermostat and the reserve tank)

Cable, Wire, and Hose Routing



1. Position the clamp bolt at this point.
2. Radiator
3. Align the marks.
4. Right Engine Cover

2

Fuel System

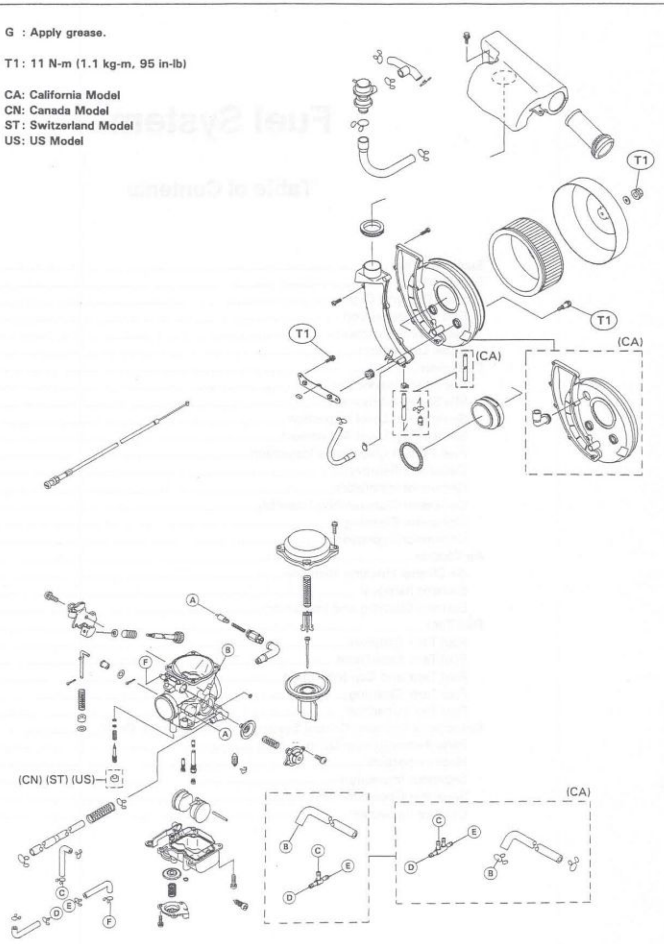
Table of Contents

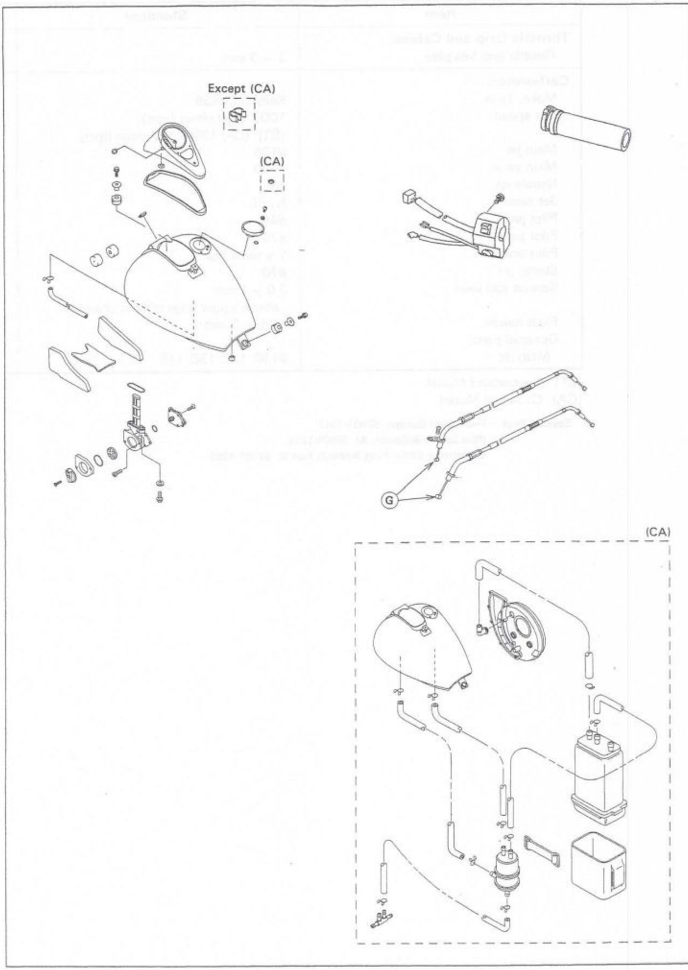
Exploded View

G : Apply grease.

T1: 11 N-m (1.1 kg-m, 95 in-lb)

CA: California Model
CN: Canada Model
ST: Switzerland Model
US: US Model




Except (CA)
(CA)
G
(CA)

Specifications

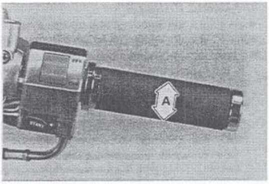
Item	Standard	Service Limit
Throttle Grip and Cables:		
Throttle grip free play	2 ~ 3 mm	– – –
Carburetor:		
Make, Type	Keihin, CVK36	– – –
Idle speed	1000 ± 50 r/min (rpm),	– – –
	(ST), (CA) 1300 ±50 r/min (rpm)	– – –
Main jet	#135	– – –
Main air jet	#100	– – –
Needle jet	#6	– – –
Jet needle	N2PE	– – –
Pilot jet	#48	– – –
Pilot air jet	#70	– – –
Pilot screw	1 ¾ turns out	– – –
Starter jet	#70	– – –
Service fuel level	2.0 ± 1 mm	– – –
	above upper edge of float chamber	
Float height	16.5 ± 2 mm	– – –
Optional parts:		
Main jet	#130, 132, 138, 140	– – –

(ST): Switzerland Model
(CA): California Model

Special Tool – Fuel Level Gauge: 57001-1017
Pilot Screw Adjuster, A: 57001-1239
Carburetor Drain Plug Wrench, Hex 3: 57001-1269

Throttle Grip and Cables

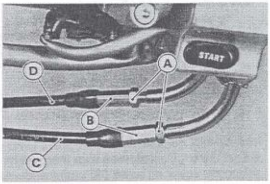
Free Play Inspection



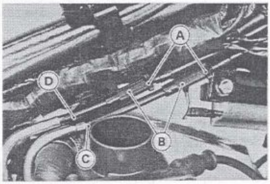
- Check that the throttle grip moves smoothly from full open to close, and the throttle closes quickly and completely in all steering positions by the return spring.
- ★If the throttle grip does not return properly, check the throttle cable routing, grip free play, and cable damage. Then lubricate the throttle cable.
- Run the engine at the idle speed, and turn the handlebar all the way to the right and left to ensure that the idle speed does not change.
- ★If the idle speed increase, check the throttle cable free play and the cable routing.
- Check the throttle grip free play [A].
- ★If the free play is incorrect, adjust the throttle cable.

Throttle Grip Free Play
Standard: 2 ~ 3 mm

Free Play Adjustment



- Loosen the locknuts [A].
- Screw the adjusters [B] in completely so as to give the throttle grip plenty of play.
- Turn out the decelerator cable [C] adjuster until there is no play when the throttle grip is completely closed.
- Tighten the locknut.
- Turn the accelerator cable [D] adjuster until the proper amount of throttle grip free play is obtained.
- Tighten the locknut.
- ★If the proper amount of free play cannot be obtained by using the adjusters, use the adjusters middle of the throttle cables.
- First give the throttle grip plenty of play by turning the adjusters at the grip in fully.
- Remove the fuel tank (see Fuel Tank Removal).
- Loosen the locknuts [A].
- Turn the adjusters [B] fully at the middle of the throttle cables so as to give the throttle grip plenty of play.
- With the throttle grip completely closed, turn the decelerator cable [C] adjuster until the inner cable just becomes tight.
- Tighten the locknut.
- Turn the accelerator cable [D] adjuster until the correct throttle grip free play is obtain.
- Tighten the locknut.



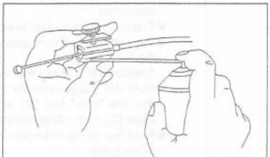
⚠WARNING

Operation with incorrectly routed or improperly adjusted cables could result in an unsafe riding condition.

Cable Lubrication

Whenever the cable is removed, lubricate the throttle cable as follows:

- Apply a thin coating of grease to the cable lower ends.
- Lubricate the cable with a penetrating rust inhibitor.



GC04011451 C

Carburetor

Idle Speed Inspection

- Start the engine and warm it up thoroughly.
- With the engine idling, turn the handlebar to both sides.

★If handlebar movement changes the idle speed, the throttle cables may be improperly adjusted or incorrectly routed, or damaged. Be sure to correct any of these conditions before riding (see Cable Routing section in General Information chapter).

> **⚠WARNING**
>
> **Operation with improperly adjusted, incorrectly routed, or damaged cables could result in an unsafe riding condition.**

- Check idle speed.

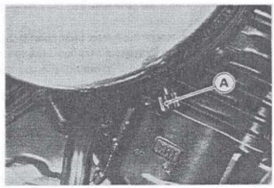
★If the idle speed is out of the specified range, adjust it.

Idle Speed
Standard: **1,000 ± 50 r/min (rpm)**
(Switzerland, U.S. Models)
1,300 ± 50 r/min (rpm)

Idle Speed Adjustment

- Start the engine and warm it up thoroughly.
- Turn the adjusting screw [A] until the idle speed is correct.

○Open and close the throttle a few times to make sure that the idle speed is within the specified range. Readjust if necessary.



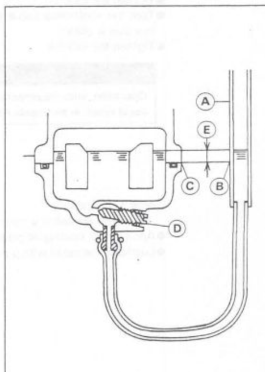
Service Fuel Level Inspection

> **⚠WARNING**
>
> **Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.**

- Situate the motorcycle so that it is perpendicular to the ground.
- Remove the fuel tank and air cleaner (see Fuel Tank Removal, Air Cleaner Housing Removal).
- Prepare an auxiliary fuel tank and connect the fuel hose to the carburetor.
- Prepare a suitable fuel hose.
- Connect the fuel level gauge [A] to the carburetor float chamber with the fuel hose.

Special Tool – Fuel Level Gauge: 57001-1017

- Hold the gauge vertically against the side of the carburetor body so that the "zero" line [B] is several millimeters higher than the upper edge [C] of the float chamber.
- Feed fuel to the carburetor, then turn the carburetor drain plug [D] out a few turns.
- Wait until the fuel level in the gauge settles.



● Keeping the gauge vertical, slowly lower the gauge until the "zero" line is even with the upper edge of the float chamber.

NOTE

○ *Do not lower the "zero" line below the upper edge of the float chamber. If the gauge is lowered and then raised again, the fuel level measured shows somewhat higher than the actual fuel level. If the gauge is lowered too far, dump the fuel into a suitable container and start the procedure over again.*

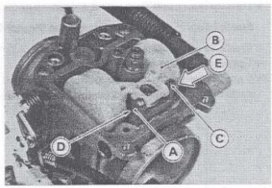
● Read the fuel level [E] in the gauge and compare to the specification.
● Screw in the carburetor drain plug.
● Stop feeding and remove the fuel level gauge.
★ If the fuel level is incorrect, adjust it (see Service Fuel Level Adjustment).

Service Fuel Level
(above upper edge of float chamber)
Standard: **2.0 ±1 mm**

Service Fuel Level Adjustment

⚠WARNING

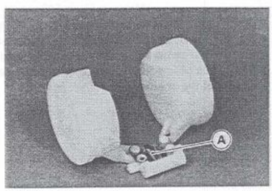
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

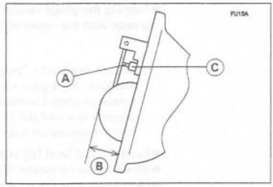


● Remove the carburetor, and drain the fuel into a suitable container.
● Remove the float chamber.
● Remove the pin [A] and take out the float [B].
● When removing and installing the pin, note the following.
○ Be careful not to snap the pin holder leg [C].
○ When removing it, tap [D] the left end of the pin.
○ When installing it, press [E] the right end of the pin.

● Bend the tang [A] on the float arm very slightly to change the float height. Increasing the float height lowers the fuel level and decreasing the float height raises the fuel level.

Float Height
Standard: **16.5 ± 2 mm**





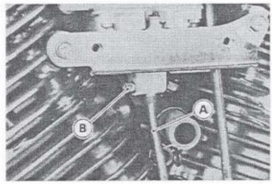
NOTE

○ *Do not push the needle rod [A] in during the float height measurement [B].*

● Assemble the carburetor, and recheck the fuel level.

★ If the fuel level cannot be adjusted by this method, the float or the float valve [C] is damaged.

Fuel System Cleanliness Inspection



⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

● Remove the fuel tank (see Fuel Tank Removal)

● Connect a suitable hose [A] to the fitting at the bottom of the carburetor float bowl.

● Run the lower end of the hose into a suitable container.

● Turn out the drain plug [B] a few turns and drain the float bowl.

Special Tool − Carburetor Drain Plug Wrench, Hex 3: 57001-1269

● Check to see if water or dirt comes out.

● Tighten the drain plug.

★ If any water or dirt appears during the above inspection, clean the fuel system (see Carburetor Cleaning and Fuel Tank Cleaning).

Carburetor Removal

⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

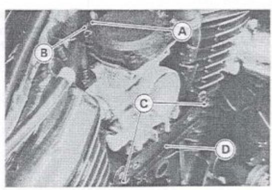
● Remove:
   Seat (see Frame chapter)
   Fuel Tank (see Fuel Tank Removal)
   Air Cleaner Housing (see Air Cleaner Housing Removal)
   Vacuum Hose [A]

● Loosen the carburetor clamp screw [B].

● Remove the bolts [C] and carburetor holder plate [D].

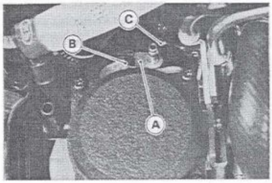
● Remove the carburetor and throttle cable ends.

● Stuff piece of lint-free, clean cloth into the carburetor holder to keep dirt out of the engine.



Carburetor Installation

- Fit the vacuum fitting boss [A] of the carburetor to the projection [B] of the clamp.
- Install the carburetor holder plate and then tighten the clamp screw [C].
- Route the cables, harness, and hoses correctly (see General Information chapter).
- Check fuel leakage from the carburetor.



⚠WARNING
Fuel spilled from the carburetor is hazardous.

- Adjust the following items if necessary.
  Idle Speed
  Throttle Cables

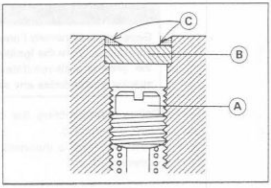
Carburetor Disassembly/Assembly

⚠WARNING
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

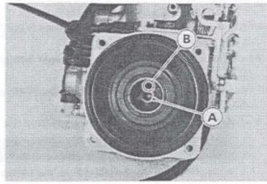
- For the US and Swiss models, remove the pilot screw plug as follows:
  ○ Punch a hole in the plug and pry there with an awl or other suitable tool.
- Turn in the pilot screw and count the number of turns until it seats fully but not tightly, and then remove the screw. This is to set the screw to its original position when assembling.
- After installing the upper chamber cover, check that the vacuum piston slides up and down smoothly without binding in the carburetor bore.

CAUTION
During carburetor disassembly, be careful not to damage the diaphragm. Never use a sharp edge to remove the diaphragm.

- Turn in the pilot screw [A] fully but not tightly, and then back it out the same number of turns counted during disassembly.
- For the US and Swiss models, install the pilot screw plug as follows:
  ○ Install a new plug [B] in the pilot screw hole, and apply a small amount of a bonding agent [C] to the circumference of the plug to fix the plug.



CAUTION
Do not apply too much bonding agent to the plug or the pilot screw itself may be fixed.



- Slip the needle through the hole in the center of the vacuum piston, and put the spring seat [A] on the top of the needle. Turn the seat so that it does not block the hole [B] at the bottom of the vacuum piston.

Carburetor Cleaning

⚠WARNING

Clean the carburetor in a well-ventilated area, and take care that there is no sparks or flame anywhere near the working area; this includes any appliance with a pilot light. Because of the danger of highly flammable liquids, do not use gasoline or low flash-point solvents to clean the carburetor.

CAUTION

Do not use compressed air on an assembled carburetor, or the floats may be crushed by the pressure, and the vacuum piston diaphragms may be damaged.
Remove as many rubber or plastic parts from the carburetor as possible before cleaning the carburetor with a cleaning solution. This will prevent damage to or deterioration of the parts.
The carburetor body has plastic parts that cannot be removed. Do not use a strong carburetor cleaning solution which could attack these parts; instead, use a mild high flash-point cleaning solution safe for plastic parts.
Do not use wire or any other hard instrument to clean carburetor parts, especially jets, as they may be damaged.

- Disassemble the carburetor.
- Immerse all the metal parts in a carburetor cleaning solution.
- Rinse the parts in water.
- When the parts are clean, dry them with compressed air.
- Blow through the air and fuel passages with compressed air.
- Assemble the carburetor.

Carburetor Inspection

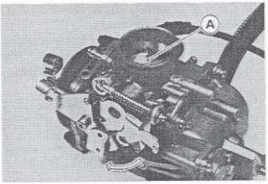
⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

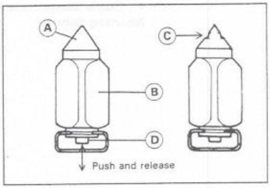
- Before disassembling the carburetor, check the fuel level (see Fuel Level Inspection).

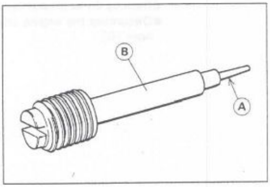
★If the fuel level is incorrect, inspect the rest of the carburetor before correcting it.

● Remove the carburetor.
● Turn the throttle cable pulley to check that the throttle butterfly valves [A] move smoothly and return by spring tension.
★ If the throttle valves do not move smoothly, replace the carburetor.

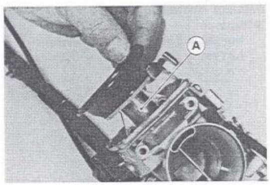


● Disassemble the carburetor.
● Clean the carburetor.
● Check that the O-rings on the float bowl and pilot screw and the diaphragm on the vacuum piston are in good condition.
★ If any of the O-rings or diaphragms are not in good condition, replace them.
● Check the plastic tip [A] of the float valve needle [B]. It should be smooth, without any grooves, scratches, or tears.
★ If the plastic tip is damaged [C], replace the needle.
● Push the rod [D] in the other end of the float valve needle, and then release it.
★ If the rod does not spring out, replace the needle.
● Check the tapered portion [A] of the pilot screw [B] for wear or damage.
★ If the pilot screw is worn or damaged on the tapered portion, it will prevent the engine from idling smoothly. Replace it.



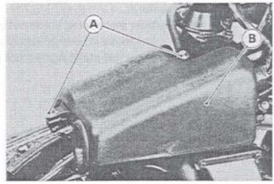


● Check that the vacuum piston [A] moves smoothly in the carburetor body. The surface of the piston must not be excessively worn.
★ If the vacuum piston does not move smoothly, or if it is very loose in carburetor body, replace the carburetor.

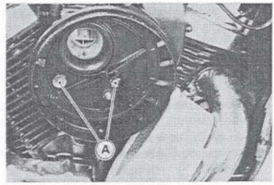


Air Cleaner

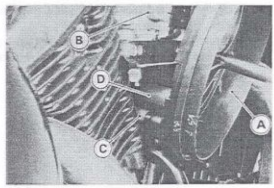
Air Cleaner Housing Removal



- Remove:
  Seat (see Frame chapter)
  Fuel Tank (see Fuel Tank Removal)
  Mounting Bolts [A] and Surge Tank [B]

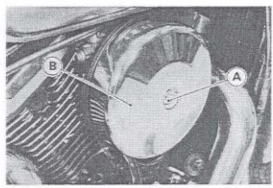


  Air Cleaner Element (see Air Cleaner Element Removal)
  Mounting Bolts [A]

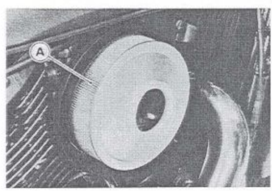


- Remove the air cleaner housing [A] from the carburetor [B].
- Disconnect the engine breather hose [C] and vacuum switch valve hose [D].

Element Removal



- Remove:
  Nut [A] and Washer
  Air Cleaner Cover [B]



  Element [A]
- Push a clean, lint-free towel into the carburetor intake to keep dirt or other foreign material from entering.

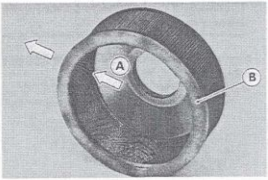
⚠WARNING
If dirt or dust is allowed to pass through into the carburetor, the throttle may become stuck, possibly causing accident.

CAUTION
If dirt gets through into the engine, excessive engine wear and possibly engine damage will occur.

Element Cleaning and Inspection

- Remove the air cleaner element (see Element Removal).
- Clean the element by tapping it lightly to loosen dust.
- Blow away the remaining dust by applying compressed air [A] from the inside to the outside (from the clean side to the dirty side).
- Visually check the element for tears or breaks and check the sponge gasket [B] also.

★If the element or gasket has any tears or breaks, replace the element.



Fuel Tank

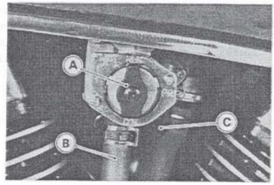
Fuel Tank Removal

⚠WARNING

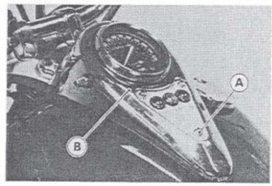
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

CAUTION

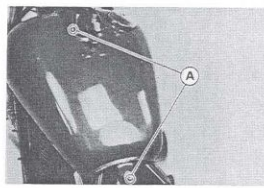
For California model, if gasoline, solvent, water or any other liquid enters the canister, the canister's vapor absorbing capacity is greatly reduced. If the canister does become contaminated, replace it with a new one.



- Turn the fuel tap [A] to the ON or RES position.
- Remove:
  Fuel Hose [B]
  Fuel Tap Vacuum Hose [C]

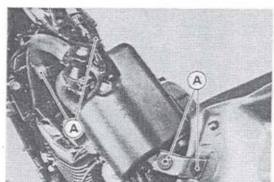


- Remove:
  Seat (see Frame chapter)
  Mounting Bolt [A] and Meter Instruments [B] (see Electrical System chapter)



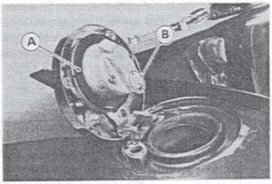
  Fuel Tank Mounting Bolts [A]
  Fuel Tank
  Evaporative Emission Hoses (California model)

Fuel Tank Installation



- Read the above WARNING.
- Route the hoses correctly (see General Information chapter).
- Be sure to install the rubber dampers [A] in place.
- Be sure the hoses are clamped securely to prevent leaks.

Fuel Tank and Cap Inspection



- Visually inspect the gasket [A] on the tank for any damage.

★Replace the gasket if it is damaged.

- Remove the fuel tank and drain it.

★Check to see if the breather pipe (also the fuel return pipe for the California model) in the tank is not clogged. Check the tank cap breather also.

★If the breather pipe is clogged, blow the breather free with compressed air.

★If the tank cap breather is clogged, replace the tank cap.

CAUTION

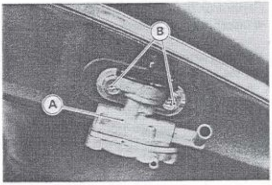
Do not apply compressed air to the air vent holes [B] in the tank cap. This could cause damage and clogging of the labyrinth in the cap.

Fuel Tank Cleaning

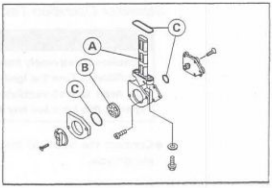
⚠WARNING

Clean the tank in a well-ventilated area, and take care that there are no sparks or flame anywhere near the working area. Because of the danger of highly flammable liquids, do not use gasoline or low flash-point solvents to clean the tank.

- Remove the fuel tank and drain it.
- Pour some high flash-point solvent into the fuel tank and shake the tank to remove dirt and fuel deposits.
- Pour high flash-point solvent through the tap in all lever positions.
- Pour the solvent out of the tank.
- Remove the fuel tap [A] from the tank by taking out the bolts [B] with washers.
- Clean the fuel tap filter screens in a high flash-point solvent.
- Dry the tank and screens with compressed air.
- Install the fuel tap on the tank.
- Install the fuel tank (see Fuel Tank Installation).



Fuel Tap Inspection



- Remove the fuel tap.
- Check the fuel tap filter screens [A] for any breaks or deterioration.

★If the screens have any breaks or are deteriorated, they may allow dirt to reach the carburetor, causing poor running. Replace the fuel tap.

★If the fuel tap leaks, or allows fuel to flow when it is ON or RES position without engine running, replace the damaged gasket [B] or O-rings [C].

Evaporative Emission Control System (California Model Only)

The Evaporative Emission Control System routes fuel vapors from the fuel system into the running engine or stores the vapors in a canister when the engine is stopped. Although no adjustments are required, a thorough visual inspection must be made at the intervals specified by the Periodic Maintenance Chart.

Parts Removal/Installation

⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

CAUTION

If gasoline, solvent, water or any other liquid enters the canister, the canister's vapor absorbing capacity is greatly reduced. If the canister does become contaminated, replace it with a new one.

● To prevent the gasoline from flowing into or out of the canister, hold the separator perpendicular to the ground.

● Connect the hoses according to the diagram of the system. Make sure they do not get pinched or kinked.

Hose Inspection

● Check that the hoses are securely connected.

● Replace any kinked, deteriorated or damaged hoses.

Separator Inspection

● Disconnect the hoses from the liquid/vapor separator, and remove the separator from the motorcycle.

● Visually inspect the separator for cracks and other damage.

★ If the separator has any cracks or is badly damaged, replace it with a new one.

Separator Operation Test

⚠WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

● Connect the hoses to the separator, and install the separator on the motorcycle.

- Disconnect the breather hose from the separator, and inject about 20 mL of gasoline into the separator through the hose fitting.
- Disconnect the fuel return hose from the fuel tank.
- Run the open end of the return hose into the container and hold it level with the tank top.
- Start the engine, and let it idle.

★If the gasoline in the separator comes out of the hose, the separator works well. If it does not, replace the separator with a new one.

Canister Inspection

- Remove the canister, and disconnect the hoses from the canister.
- Visually inspect the canister for cracks and other damage.

★If the canister has any cracks or bad damage, replace it with a new one.

NOTE

○*The canister is designed to work well through the motorcycle's life without any maintenance if it is used under normal conditions.*

[illegible]

NOTE

[illegible]

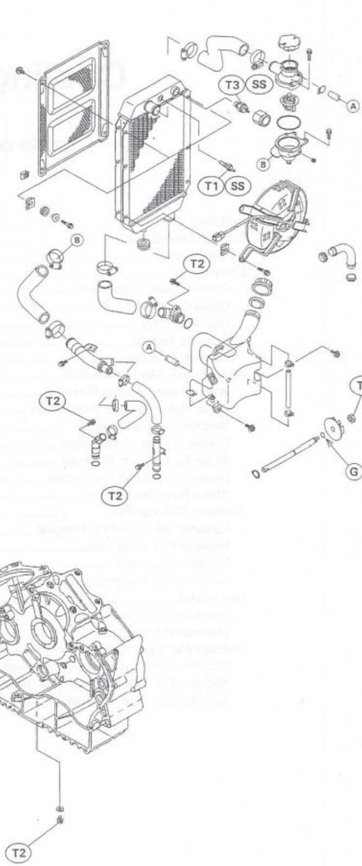
Cooling System

Table of Contents

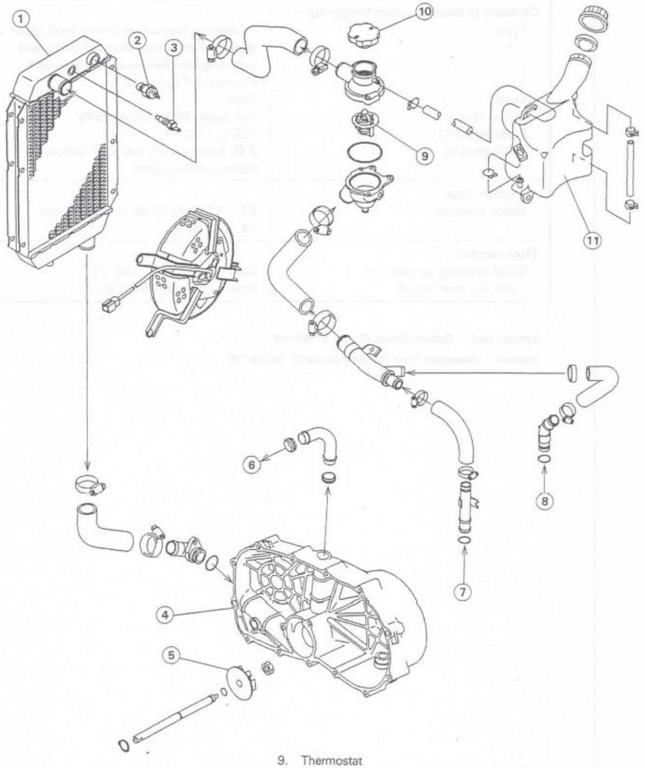
Exploded View

G : Apply grease.
SS: Apply silicone sealant.

T1: 7.8 N-m (0.80 kg-m, 69 in-lb)
T2: 11 N-m (1.1 kg-m, 95 in-lb)
T3: 18 N-m (1.8 kg-m, 13.0 ft-lb)



Coolant Flow Chart



1. Radiator
2. Fan Switch
3. Water Temperature Sensor
4. Right Engine Cover
5. Water Pump Impeller
6. To Crankcase
7. From Rear Cylinder Head
8. From Front Cylinder Head
9. Thermostat
   When the engine is cold, the thermostat is closed so that the coolant flow is restricted through the air bleeder hole, causing the engine to warm up more quickly.
10. Radiator Cap
11. Reserve Tank
    When the engine is very hot, the pressure valve in the radiator cap allows air and vapor to escape into the reserve tank. When the engine cools down, the pressure drop draws the vacuum valve (another small valve) open, admitting coolant from the reserve tank into the radiator.

Specifications

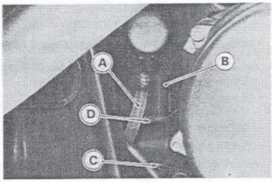
Item	Standard	Service Limit
Coolant provided when shipping:		
Type	Permanent type of antifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators)	- - -
Color	Green	- - -
Mixed ratio	Soft water 50%, coolant 50%	- - -
Freezing point	−35°C (−31°F)	- - -
Total amount	2.4L (reserve tank full level including radiator and engine)	- - -
Radiator cap:		
Relief pressure	93 ~ 123 kPa (0.95 ~ 1.25 kg/cm², 14 ~ 18 psi)	- - -
Thermostat:		
Valve opening temperature	58 ~ 62°C (136 ~ 144 °F)	- - -
Valve full opening lift	8mm or more @95°C (203 °F)	- - -

Special Tool – Outside Circlip Pliers: 57001-144

Sealant – Kawasaki Bond (Silicone Sealant): 56019-120

Coolant

Coolant Level Inspection



NOTE

○ *Check the level when the engine is cold (room or ambient temperature).*

● Situate the motorcycle so that it is perpendicular to the ground (on its side stand).

● Check the coolant level through the coolant level gauge [A] on the coolant reserve tank [B].

★ If the coolant level is lower than the "L" (Low) level line [C], add coolant to the "F" (Full) level line [D].

CAUTION

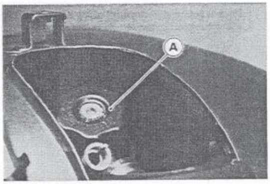
For refilling, add the specified mixture of coolant and soft water. Adding water alone dilutes the coolant and degrades its anticorrosion properties. The diluted coolant can attack the aluminum engine parts. In an emergency, soft water alone can be added. But the diluted coolant must be returned to the correct mixture ratio within a few days.
If coolant must be added often, or the reservoir tank has run completely dry; there is probably leakage in the cooling system. Check the system for leaks.

Coolant Draining

⚠WARNING

To avoid burns, do not remove the radiator cap or try to change the coolant when the engine is still hot. Wait until it cools down.
Coolant on tires will make them slippery and can cause an accident and injury. Immediately wipe up or wash away any coolant that spills on the frame, engine, or other painted parts.
Since coolant is harmful to the human body, do not use for drinking.

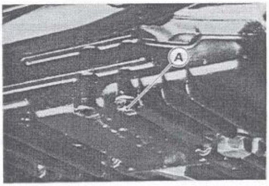
● Remove:
Meter Instruments (see Electrical System chapter)
Radiator Cap [A]



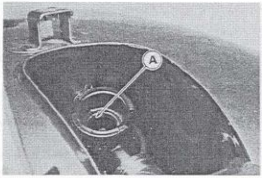
● Place a container under the drain plug [A] at the bottom of the right crankcase.

● Drain the coolant from the radiator and engine by removing the drain plug.

● Remove the cap and pump out the coolant using a syringe or some other suitable device.



Coolant Filling



● Tighten the drain plug.

Torque − Drain Plug: 11 N-m (1.1 kg-m, 95 in-lb)

● Fill the radiator up to the radiator filler neck [A] with coolant, and install the radiator cap.

NOTE

○ *Pour in the coolant slowly so that it can expel the air from the engine and radiator.*

● Fill the reserve tank up to the "F" level line with coolant, and install the cap.

CAUTION
Soft or distilled water must be used with the antifreeze (see below for antifreeze) in the cooling system. If hard water is used in the system, it causes scales accumulation in the water passages, and considerably reduces the efficiency of the cooling system.

Water and Coolant Mixture Ratio (Recommended)

Soft Water	:	**50%**
Coolant	:	**50%**
Freezing Point	:	**−35°C (−31°F)**
Total Amount	:	**2.4 L**

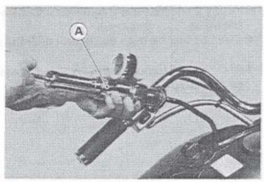
NOTE

○ *Choose a suitable mixture ratio by referring to the coolant manufacturer's directions.*

● Start the engine, warm it up thoroughly until the radiator fan turns on and then stop the engine.
● Check the coolant level in the reserve tank after the engine cools down.
★ If the coolant level is lower than the "L" level line, add coolant to the "F" level line.

CAUTION
Do not add more coolant above the "F" level line.

Pressure Testing



● Remove the meter instruments (see Electrical System chapter).
● Remove the radiator cap, and install a cooling system pressure tester [A] on the filler neck.

NOTE

○ *Wet the cap sealing surfaces with water or coolant to prevent pressure leaks.*

● Build up pressure in the system carefully until the pressure reaches 123 kPa (1.25 kg/cm², 18 psi).

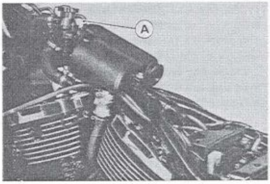
CAUTION

During pressure testing, do not exceed the pressure for which the system is designed. The maximum pressure is 123 kPa (1.25 kg/cm², 18 psi).

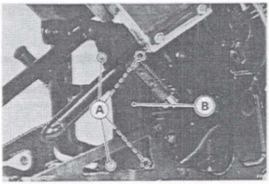
● Watch the gauge for at least 6 seconds.
★ If the pressure holds steady, the system is all right.
★ If the pressure drops soon, check for leaks.

Reserve Tank Removal

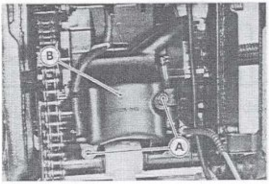
● Remove:
  Seat (see Frame chapter)
  Fuel Tank (see Fuel System chapter)
  Coolant Hose [A]



  Rear Wheel (see Wheels/Tires chapter)
  Rear Shock Absorber (see Suspension chapter)
  Bolts [A] and Rear Wheel Mud Guard [B]



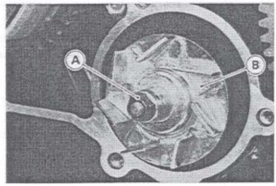
  Bolts [A] and Reserve Tank [B]



Water Pump, Mechanical Seal

Water Pump Impeller Removal

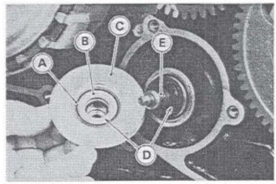
- Drain:
  Engine Oil (see Engine Lubrication System chapter)
  Coolant (see Coolant Draining)
- Remove:
  Right Engine Cover (see Clutch chapter)
  Nut [A]
  Impeller [B]



Water Pump Impeller Installation

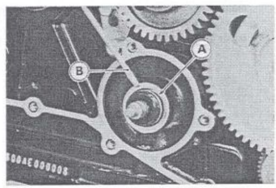
- Be sure to install the rubber seal [A] and sealing seat [B] into the impeller [C] by hand until the seat bottoms out.
- Apply a little coolant to the sliding surface [D] of the mechanical seal and sealing seat to give the seal initial lubrication.
- Be sure to install a new O-ring [E] on the shaft.
- Tighten the impeller nut.

Torque − Water Pump Impeller Nut: 11 N-m (1.1 kg-m, 95 in-lb)

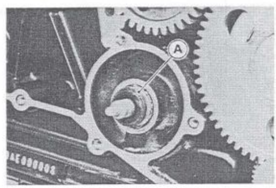


Mechanical Seal Removal

- Remove:
  Clutch (see Clutch chapter)
  Water Pump Impeller (see Water Pump Impeller Removal)
  O-ring
- Pry the mechanical seal flange [A] off with a small chisel [B].



- Pull the mechanical seal [A] out of the crankcase with pliers.



CAUTION
Be careful not to damage the water pump shaft and the inner sealing surface of the crankcase.

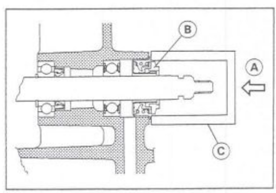
- Discard the mechanical seal.

Mechanical Seal Installation

NOTE

○ *Since the replacement mechanical seal has an adhesive coated body, do not apply liquid gasket to the exterior surface of the body.*

- Press [A] the new mechanical seal [B] into the hole by using a suitable socket [C] until it bottoms out.



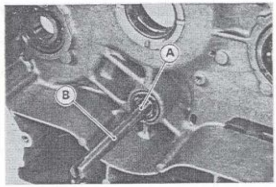
CAUTION
Be careful not to damage the water pump shaft and mechanical seal.

Water Pump Shaft Removal

● Split the crankcase (see Crankshaft/Transmission chapter).
● Remove the circlip [A] from the water pump shaft [B].

Special Tool – Outside Circlip Pliers: 57001-144

● remove the shaft from the outside of the crankcase to the inside.



Water Pump Shaft Installation

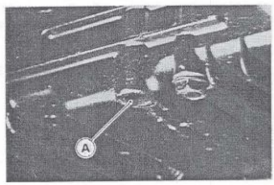
● Insert the water pump shaft from outside of the crankcase to the inside.
● Install the circlip to the shaft.

Special Tool – Outside Circlip Pliers: 57001-144

Water Pump Inspection

● Check the drainage outlet passage [A] at the bottom of the right crankcase for coolant leaks.

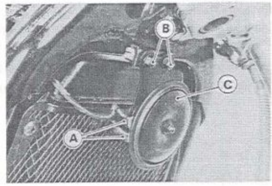
★ If the mechanical seal is damaged, the coolant leaks through the seal and drains through the passage. Replace the mechanical seal and impeller with new ones.



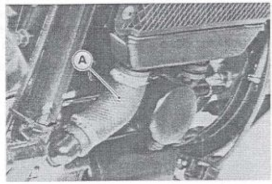
Radiator, Radiator Fan

Radiator, Radiator Fan Removal

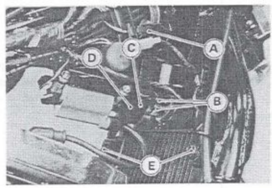
- Remove:
  Coolant (see Coolant Draining)
  Seat (see Frame chapter)
  Fuel Tank (see Fuel System chapter)
  Horn Lead Connectors [A]
  Bolts [B] and Horn [C]



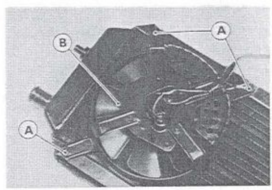
Radiator Hose [A]



Radiator Fan Connector [A]
Fan Switch Lead Connectors [B]
Water Temperature Sensor Lead Connector [C]
Radiator Hose [D]
Radiator Mounting Bolts [E]
Radiator

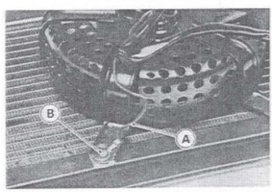


Radiator Fan Mounting Bolts [A]
Radiator Fan [B]



Radiator Fan Installation

- Be sure to attach the ground lead [A] to the fan mounting bolt [B].



Radiator Inspection

● Check the radiator core.

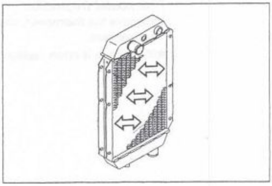
★ If there are obstructions to air flow, remove them.

★ If the corrugated fins are deformed, carefully straighten them.

★ If the air passages of the radiator core are blocked more than 20% by unremovable obstructions or irreparably deformed fins, replace the radiator with a new one.

CAUTION

When cleaning the radiator with steam cleaner, be careful of the following to prevent radiator damage.
1) Keep the steam gun away more than 0.5 m from the radiator core.
2) Hold the steam gun perpendicular to the core surface.
3) Run the steam gun horizontally following the core fin direction. Running it vertically may damage the fin.

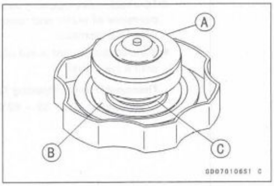


Radiator Cap Inspection

● Check the condition of the top [A] and bottom [B] valve seals.

★ If any one of them shows visible damage, replace the cap with a new one.

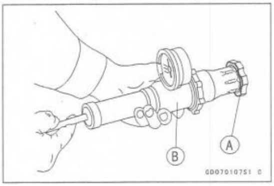
Valve Spring [C]



● Install the cap [A] on a cooling system pressure tester [B].

NOTE

○ *Wet the cap sealing surfaces with water or coolant to prevent pressure leaks.*



● Watching the pressure gauge, slowly pump the pressure tester to build up the pressure. The gauge pointer must remain within the relief pressure range in the table below at least 6 seconds. Continue to pump the tester until the relief valve opens, indicated by the gauge pointer flicks downward. The relief valve must open within the specified range.

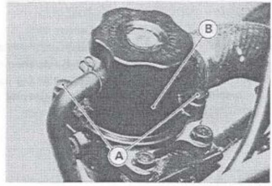
Radiator Cap Relief Pressure
Standard: 93 ~ 123 kPa (0.95 ~ 1.25 kg/cm², 14 ~ 18 psi)

★ If the cap cannot hold the specified pressure, or if it holds too much pressure, replace it with a new one.

Thermostat

Thermostat Removal

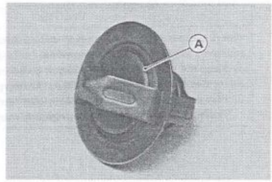
● Remove:
  Coolant (see Coolant Draining)
  Seat (see Frame chapter)
  Fuel Tank (see Fuel System chapter)
  Thermostat Housing Cover Bolts [A]
  Thermostat Housing Cover [B]
  Thermostat



Thermostat Inspection

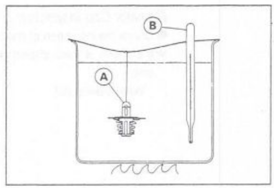
● Remove the thermostat, and inspect the thermostat valve [A] at room temperature.

★ If the valve is open, replace the thermostat with a new one.



● To check valve opening temperature, suspend the thermostat [A] in a container of water and raise the temperature of the water.
  [B] Thermometer

★ If the measurement is out of the specified range, replace the thermostat with a new one.

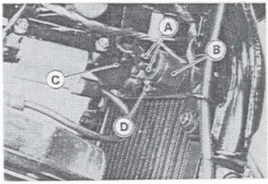


Thermostat Valve Opening Temperature

Standard: **58 ~ 62°C (136 ~ 144°F)**

Radiator Fan Switch, Water Temperature Sensor

Radiator Fan Switch, Water Temperature Sensor Removal



CAUTION

The fan switch or the water temperature sensor should never be allowed to fall on a hard surface. Such a shock to their parts can damage them.

- Drain the coolant (see Coolant Draining).
- Remove:
  Fuel Tank (see Fuel System chapter)
  Radiator Fan Switch Lead Connectors [A]
  Cover [B] and Radiator Fan Switch
  Water Temperature Sensor Lead Connector [C]
  Water Temperature Sensor [D]

Radiator Fan Switch, Water Temperature Sensor Installation

- Apply silicone sealant to the threads of the fan switch and water temperature sensor.

Sealant – Kawasaki Bond (Silicone Sealant): 56019-120

- Tighten the fan switch and water temperature sensor.

Torque – Radiator Fan Switch : 18 N-m (1.8 kg-m, 13.0 ft-lb)
Water Temperature Sensor : 7.8 N-m (0.80 kg-m, 69 in-lb)

Radiator Fan Switch, Water Temperature Sensor Inspection

- Refer to Electrical System chapter for these inspections.

Radiator Fan Switch, Water Temperature Sensor

Radiator Fan Switch, Water Temperature Sensor Removal

CAUTION

The fan switch or the water temperature sensor should never be allowed to fall on a hard surface. Such a shock to their parts can damage them.

- Drain the coolant (see Coolant Draining).
- Remove:
  - Fuel Tank (see Fuel System chapter)
  - Radiator Fan Switch Lead Connectors (A)
  - Cover (B) and Radiator Fan Switch
  - Water Temperature Sensor Lead Connector (C)
  - Water Temperature Sensor (D)

Radiator Fan Switch, Water Temperature Sensor Installation

- Apply silicone sealant to the threads of the fan switch and water temperature sensor.

Sealant – Kawasaki Bond (Silicone Sealant): [illegible]

- Tighten the fan switch and water temperature sensor.

Torque – Radiator Fan Switch: [illegible]
Water Temperature Sensor: [illegible]

Radiator Fan Switch, Water Temperature Sensor Inspection

- [illegible]

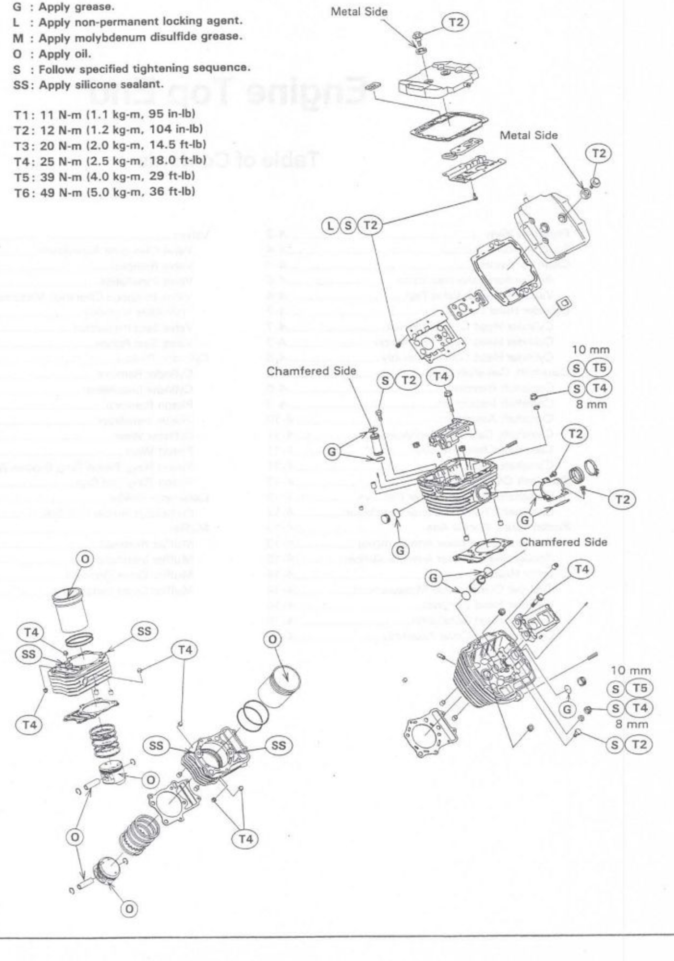
Engine Top End

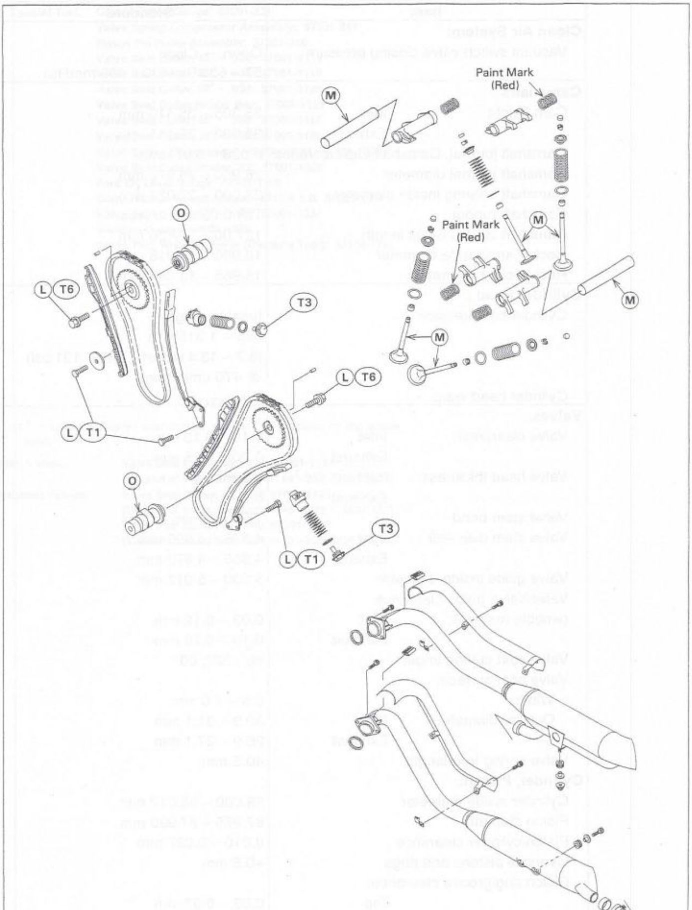
Table of Contents

Exploded View

G : Apply grease.
L : Apply non-permanent locking agent.
M : Apply molybdenum disulfide grease.
O : Apply oil.
S : Follow specified tightening sequence.
SS: Apply silicone sealant.

T1: 11 N-m (1.1 kg-m, 95 in-lb)
T2: 12 N-m (1.2 kg-m, 104 in-lb)
T3: 20 N-m (2.0 kg-m, 14.5 ft-lb)
T4: 25 N-m (2.5 kg-m, 18.0 ft-lb)
T5: 39 N-m (4.0 kg-m, 29 ft-lb)
T6: 49 N-m (5.0 kg-m, 36 ft-lb)




Paint Mark
(Red)
M
Paint Mark
(Red)
M
O
L
T6
T3
M
M
L
T6
L
T1
O
T3
L
T1

Specifications

Item		Standard	Service Limit
Clean Air System:			
Vacuum switch valve closing pressure:		Open → Close 57 ~ 65 kPa (430 ~ 490 mmHg)	– – –
Camshafts			
Cam height :	Inlet	35.305 ~ 35.413 mm	35.21 mm
	Exhaust	35.033 ~ 35.141 mm	34.93 mm
Camshaft journal, Camshaft cap clearance		0.028 ~ 0.071 mm	0.16 mm
Camshaft journal diameter		26.950 ~ 26.972 mm	26.92 mm
Camshaft bearing inside diameter		27.000 ~ 27.021 mm	27.08 mm
Camshaft runout		TIR 0.02 mm or less	TIR 0.1 mm
Camshaft chain 20-link length		127.00 ~ 127.36 mm	128.9 mm
Rocker arm inside diameter		16.000 ~ 16.018 mm	16.05 mm
Rocker shaft diameter		15.965 ~ 15.984 mm	15.94 mm
Cylinder Head :			
Cylinder compression		(usable range) 855 ~ 1 315 kPa (8.7 ~ 13.4 kgf/cm², 124 ~ 191 psi) @ 470 r/min (rpm)	– – –
Cylinder head warp		– – –	0.05 mm
Valves:			
Valve clearance:	Inlet	0.10 ~ 0.15 mm	– – –
	Exhaust	0.20 ~ 0.25 mm	– – –
Valve head thickness:	Inlet	0.5 mm	0.3 mm
	Exhaust	0.8 mm	0.5 mm
Valve stem bend		TIR 0.01 mm or less	TIR 0.05 mm
Valve stem diameter :	Inlet	4.975 ~ 4.990 mm	4.96 mm
	Exhaust	4.955 ~ 4.970 mm	4.94 mm
Valve guide inside diameter		5.000 ~ 5.012 mm	5.07 mm
Valve/valve guide clearance			
(wobble method):	Inlet	0.03 ~ 0.12 mm	0.26 mm
	Exhaust	0.10 ~ 0.18 mm	0.32 mm
Valve seat cutting angle		45°, 32°, 60°	– – –
Valve seat surface:			
Width		0.5 ~ 1.0 mm	– – –
Outside diameter:	Inlet	30.9 ~ 31.1 mm	– – –
	Exhaust	26.9 ~ 27.1 mm	– – –
Valve spring free length		40.5 mm	38.6 mm
Cylinder, Piston:			
Cylinder inside diameter		88.000 ~ 88.012 mm	88.11 mm
Piston diameter		87.975 ~ 87.990 mm	87.83 mm
Piston/cylinder clearance		0.010 ~ 0.037 mm	– – –
Oversize pistons and rings		+0.5 mm	– – –
Piston ring/groove clearance:			
	Top	0.03 ~ 0.07 mm	0.17 mm
	Second	0.02 ~ 0.06 mm	0.16 mm
Piston ring groove width:	Top	1.02 ~ 1.04 mm	1.12 mm
	Second	1.01 ~ 1.03 mm	1.11 mm
Piston ring thickness:	Top & Second	0.97 ~ 0.99 mm	0.90 mm
Piston ring end gap:	Top	0.25 ~ 0.40 mm	0.7 mm
	Second	0.40 ~ 0.55 mm	0.9 mm

Special Tool – **Compression Gauge: 57001-221**
Valve Spring Compressor Assembly: 57001-241
Piston Pin Puller Assembly: 57001-910
Valve Seat Cutter, 45° – Φ32: 57001-1115
Valve Seat Cutter, 32° – Φ28: 57001-1119
Valve Seat Cutter, 60° – Φ30: 57001-1123
Valve Seat Cutter Holder Bar: 57001-1128
Valve Seat Cutter, 45° – Φ30: 57001-1187
Valve Seat Cutter, 32° – Φ33: 57001-1199
Valve Spring Compressor Adapter, Φ22: 57001-1202
Valve Seat Cutter Holder, Φ5: 57001-1208
Fork Oil Level Gauge: 57001-1290
Compression Gauge Adapter, M10 X 1.0: 57001-1317
Valve Seat Cutter, 60° – Φ33: 57001-1334
Vacuum Gauge: 57001-1369
Spark Plug Wrench, 16mm (Owner's Tool): 92110-1132

NOTE

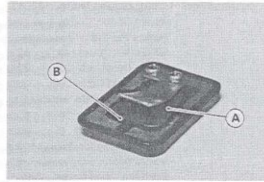
○ *The following valve seat cutters can be used instead of the above tools.*

Inlet Valves: **Valve Seat Cutter, 55 °-Φ35: 57001-1247**
(instead of Valve Seat Cutter: 60°-Φ33: 57001-1334)

Exhaust Valves: **Valve Seat Cutter, 45°-Φ32: 57001-1115**
(instead of Valve Seat Cutter: 45°-Φ30: 57001-1187)
Valve Seat Cutter, 32°-Φ30: 57001-1120
(instead of Valve Seat Cutter: 32°-Φ28: 57001-1119)

Clean Air System

Air Suction Valve Inspection



●Visually inspect the reed [A] for cracks, folds, warps, heat damage, or other damage.

★If there is any doubt as to the condition of the reed, replace the air suction valve as an assembly.

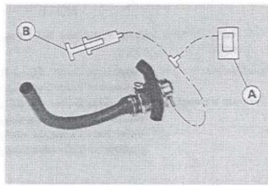
●Check the reed contact areas [B] of the valve holder for grooves, scratches, any signs of separation from the holder, or heat damage.

★If there is any doubt as to the condition of the reed contact areas, replace the air suction valve as an assembly.

★If any carbon or other foreign particles have accumulated between the reed and the reed contact area, wash the valve assembly with a high flash-point solvent.

CAUTION
Do not scrape off the deposits with a scraper as this could damage the rubber, requiring replacement of the suction valve assembly.

Vacuum Switch Valve Test

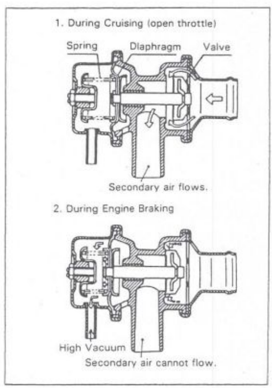


Using the vacuum gauge and a syringe, inspect the vacuum switch operation as follows:

●Remove the vacuum switch valve.

●Connect the vacuum gauge [A] and syringe [B] or fork oil level gauge to the vacuum hoses as shown.

Special Tool – Vacuum Gauge: 57001-1369
Fork Oil Level Gauge: 57001-1290



●Gradually raise the vacuum (lower the pressure) applied to the vacuum switch valve, and check the valve operation. When the vacuum is low, the vacuum switch valve should permit air to flow. When the vacuum raises to 57 ~ 65 kPa (430 ~ 490 mm Hg), it should stop air flow.

★If the vacuum switch valve does not operate as described, replace it with a new one.

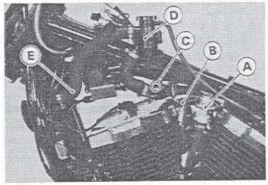
NOTE

○*To check air flow through the vacuum switch valve, just blow through the air cleaner hose.*

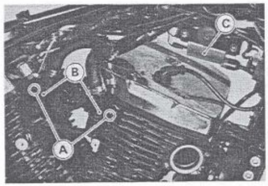
Vacuum Switch Valve Closing Pressure (Open → Close)
Standard: 57 ~ 65 kPa (430 ~ 490 mmHg)

Cylinder Head Cover

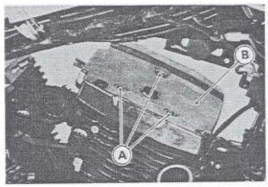
Cylinder Head Cover Removal



- Remove:
  Seat (see Frame chapter)
  Fuel Tank, Air Cleaner Housing and Carburetor (see Fuel System chapter)
  Muffler (for Rear Head Cover) (see Muffler Removal)
  Vacuum Switch Valve [A] and Hose [B]
  Coolant Hose Clamp Bolt [C]
  Thermostat Housing [D]
  Radiator Hose [E]

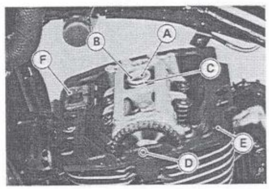


  Coolant Hose Clamp Bolts [A] and Hoses [B]
  Spark Plug Cap
  Front Ignition Coil [C] (for Front Head Cover) (see Electrical System chapter)

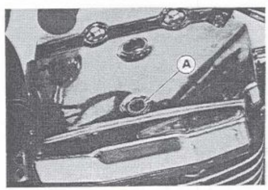


  Cover Bolts [A]
  Cylinder Head Cover [B]
  Air Suction Valve
  Head Cover Gasket

Cylinder Head Cover Installation



- If the plug pipe [A] was removed, install it with the chamfered side [B] faces upward, and apply grease to the O-rings [C].
- Install:
  Pin [D]
  Head Cover Gasket [E]
  Air Suction Valve [F] (as shown)



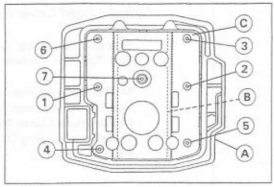
- Install the washers with the metal side [A] faces upward.
- Tighten the cover bolts.

Torque – Cylinder Head Cover Bolts: 12 N-m (1.2 kg-m, 104 in-lb)

Cylinder Head Cover Assembly

- Apply a non-permanent locking agent to the threads of the damper plate bolts [1 ~ 7], and tighten them to the tightening sequence.
  - [A] Cylinder Head Cover
  - [B] Damper
  - [C] Damper Plate

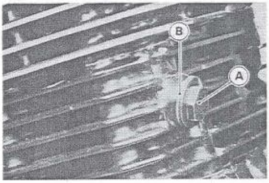
Torque − Cylinder Head Cover Damper Plate Bolts: 12 N-m (1.2 kg-m, 104 in-lb)



Camshaft, Camshaft Chain

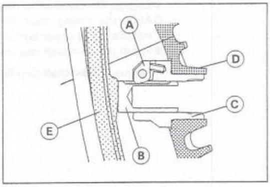
Camshaft Removal

- Remove:
  Cylinder Head Cover (see Cylinder Head Cover Removal)
  Tensioner Cap Bolt [A], Washer [B] and Spring



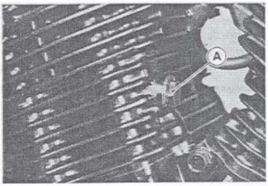
CAUTION
Do not turn over the crankshaft while the tensioner cap bolt is removed. The tensioner body is loose from the cylinder while the cap bolt is removed. Turning the crankshaft could damage the tensioner body and/or cylinder, and also the valves because upsetting the camshaft chain timing.

- Release the stopper [A] and push the push rod [B] into the tensioner body [C].
  [D] Cylinder
  [E] Camshaft Chain Guide

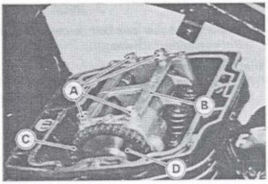


NOTE

○ *Temporarily, install the tensioner cap bolt [A] only to prevent the tensioner body from falling into the crankcase.*



- Remove:
  Camshaft Cap Bolts [A]
  Camshaft Cap [B]
- Disengage the camshaft chain [C] from the camshaft sprocket [D], and remove the camshaft.



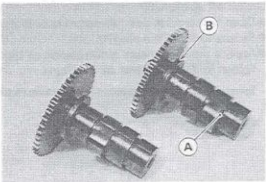
CAUTION
The crankshaft may be turned while the camshaft is removed. Always pull the chain taut while turning the crankshaft. This avoids kinking the chain on the lower (crankshaft) sprocket. A kinked chain could damage both the chain and the sprocket.

Camshaft Installation

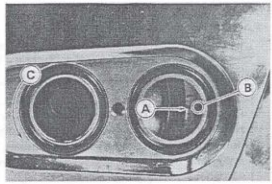
- Apply engine oil to all cam parts and journals.

NOTE

○ *The front and rear camshafts are different. The rear camshaft [A] has a groove [B].*

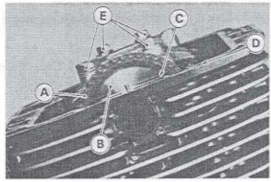


●Set the front piston at TDC.
○Align the front piston TDC mark [A] and timing mark [B] by turning the crankshaft counterclockwise [C] (left side view).



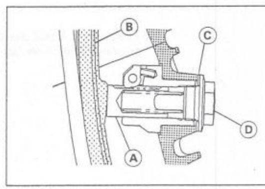
●Engage the camshaft chain [A] with the camshaft sprocket [B].
○Align the timing mark line [C] on the camshaft sprocket with the cylinder head upper surface [D].
●Install the camshaft cap and tighten the cap bolts [E].

Torque − Camshaft Cap Bolts: 25 N-m (2.5 kg-m, 18.0 ft-lb)



●Install the front camshaft chain tensioner as follows:
○Remove the cap bolt installed temporarily.
○Hold the tensioner body and push the push rod [A] until the rod touches to the chain guide [B] lightly.
○Install the spring, washer [C] and cap bolt [D].

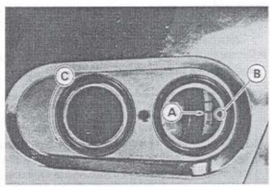
Torque − Camshaft Chain Tensioner Cap Bolt: 20 N-m (2.0 kg-m, 14.5 ft-lb)



NOTE

○*Installing the rear camshaft is the same as for the front camshaft. But noting the following.*

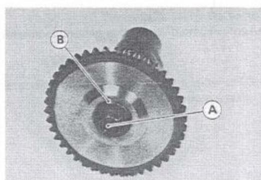
●Set the rear piston at TDC.
○Align the rear piston TDC mark [A] and timing mark [B] by turning the crankshaft counterclockwise [C] 305° (left side view).



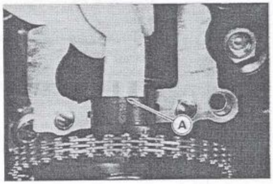
Camshaft Assembly

●Clean the sprocket bolt [A] and threads of the camshaft.
●Be sure to install the pin [B].
●Apply a non-permanent locking agent to the threads of the bolt, and tighten it. The sprockets are identical.

Torque − Camshaft Sprocket Bolt: 49 N-m (5.0 kg-m, 36 ft-lb)



Camshaft, Camshaft Cap Wear



- Measure each clearance between the camshaft journal and the camshaft cap using plastigage (press gauge) [A].
- Tighten the camshaft cap bolts.

Torque – Camshaft Cap Bolts: 25 N-m(2.5 kg-m, 18.0 ft-lb)

NOTE

○ *Do not turn the camshaft when the plastigage is between the journal and camshaft cap.*

★If any clearance exceeds the service limit, measure the diameter of each camshaft journal with a micrometer.

Camshaft Journal, Camshaft Cap Clearance

Standard:	**0.028 ~ 0.071 mm**
Service Limit:	**0.16 mm**

★If the camshaft journal diameter is less than the service limit, replace the camshaft with a new one and measure the clearance again.

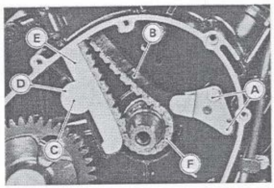
Camshaft Journal Diameter

Standard:	**26.950 ~ 26.972 mm**
Service Limit:	**26.92 mm**

★If the clearance still remains out of the limit, replace the cylinder head unit.

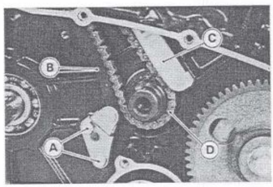
Camshaft Chain Removal

Front Camshaft Chain:



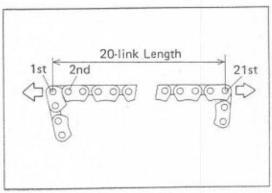
- Remove:
  Alternator Rotor (see Electrical System chapter)
  Bolts [A] and Black Chain Guide [B]
  Bolt [C], Washer [D] and White Chain Guide [E]
- Disengage the camshaft chain [F] from the crankshaft sprocket and then remove the chain.

Rear Camshaft Chain:



- Remove:
  Primary Gear (see Crankshaft/Transmission chapter)
  Clutch (see Clutch chapter)
  Bolts [A] and Black Chain Guide [B]
  White Chain Guide [C]
- Disengage the camshaft chain [D] from the crankshaft sprocket and then remove the chain.

Camshaft Chain Wear



- Hold the chain taut with a force of about 5 kg is some manner, and measure a 20-link length. Since the chain may wear unevenly, take measurement at several places.

★If any measurement exceeds the service limit, replace the chain.

Camshaft Chain 20-link Length

Standard:	**127.00 ~ 127.36 mm**
Service Limit:	**128.9 mm**

Camshaft Chain Tensioner

Camshaft Chain Tensioner Removal

- Remove:
  - Engine (see Engine Removal/Installation chapter)
  - Camshaft (see Camshaft Removal)
  - Cylinder Head (see Cylinder Head Removal)
- Remove the camshaft chain tensioner body from the cylinder.

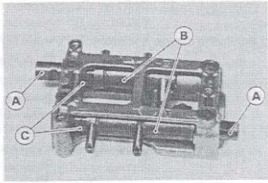
Camshaft Chain Tensioner Installation

- Refer:
  - Cylinder Head Installation
  - Camshaft Installation

Rocker Shaft, Rocker Arm

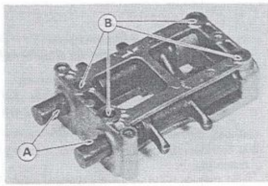
Rocker Shaft, Rocker Arm Removal

- Remove:
  - Cylinder Head Cover (cylinder Head Cover Removal)
  - Camshaft Cap
  - Rocker Shafts [A]
  - Rocker Arms [B] and Springs [C]



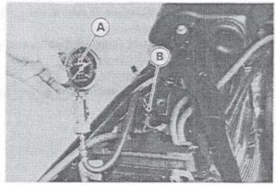
Rocker Shaft, Rocker Arm Installation

- Apply molybdenum disulfide grease to the rocker shaft.
- Insert the rocker shaft into the camshaft cap and rocker arm so that the notch side [A] faces to the spring side.
- Align the bolt holes [B] of the camshaft cap and rocker shaft.



Cylinder Head

Cylinder Compression Measurement



- Warm up the engine thoroughly.
- Stop the engine, and remove the spark plugs.

Special Tool – Spark Plug Wrench, 16mm (Owner's Tool): 92110-1132

- Measure the cylinder compression.
- ○ Using the starter motor, turn the engine over with the throttle fully open until the compression gauge stops rising; the compression is the highest reading obtainable.

Special Tool – Compression Gauge: 57001-221 [A]
Compression Gauge Adapter, M10 X 1.0: 57001-1317 [B]

NOTE

○ *Be sure the battery is fully charged.*
○ *Be sure no air leaks out of the cylinder head gasket.*

Cylinder Compression
Usable Range: 855 ~ 1315 kPa (8.7 ~ 13.4 kg/cm², 124 ~ 191 psi) @ 470 r/min (rpm)

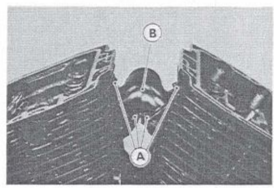
○ Repeat the measurement for the other cylinder.

★If cylinder compression is higher than the usable range, check the following:
(1) Carbon build-up on the cylinder head combustion chamber and the piston crown.
(2) Cylinder head gasket is not the original part.
(3) Valve stem oil seals and/or piston rings are damaged.

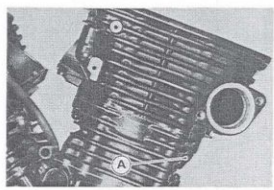
★If cylinder compression is lower than the usable range, check the following:
(1) Condition of the valve seat is wrong.
(2) Valve clearance is too small.
(3) Piston/cylinder clearance is excessive.
(4) Cylinder head is warped and/or head gasket is damaged.
(5) Piston ring/piston ring groove clearance is excessive.

Cylinder Head Removal

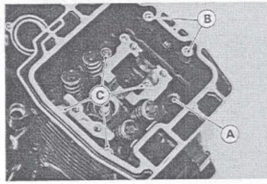
- Remove:
  Engine (see Engine Removal/Installation)
  Camshaft (see Camshaft Removal)
  Bolts [A] and Intake Manifold [B]



8 mm Cylinder Head Nuts [A]



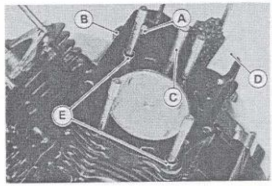
Cylinder Head Bolt [A]
Cylinder Head Nuts [B]
10 mm Cylinder Head Nuts [C]
Cylinder Head



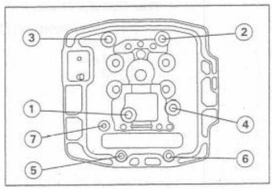
Cylinder Head Installation

NOTE

- ○ *The camshaft cap is machined with the cylinder head, so if a new cylinder head is installed, use the cap that is supplied with the new head.*
- ○ *The rear cylinder head has a breather pipe fitting. Be careful not to mix up the front and rear heads.*



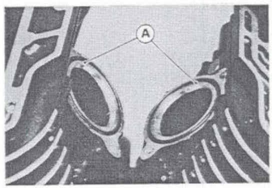
- ● Release the stopper and push the push rod into the tensioner body [A], and tighten the cap bolt [B] only temporarily.
- ● Install:
  Oil Pipe [C]
  White Chain Guide [D]
  Knock Pins [E]
  New Cylinder Head Gasket
- ● Tighten the head nuts and bolt following the tightening sequence [1 ~ 7].



Torque – Cylinder Head Nuts:
10 mm [1 ~ 4]: 39 N-m (4.0 kg-m, 29 ft-lb)
8 mm [5 ~ 6]: 25 N-m (2.5 kg-m, 18.0 ft-lb)
Cylinder Head Bolt [7]: 12 N-m (1.2 kg-m, 104 in-lb)

- ● Tighten the 8 mm cylinder head nuts.

Torque – Cylinder Head Nuts (8 mm): 25 N-m (2.5 kg-m, 18.0 ft-lb)

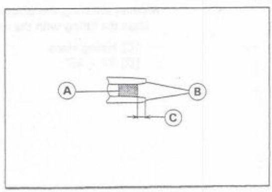


- ● Apply grease to the O-rings [A].
- ● Install the intake manifold, and tighten the bolts.

Torque – Intake Manifold Bolts: 12 N-m (1.2 kg-m, 104 in-lb)

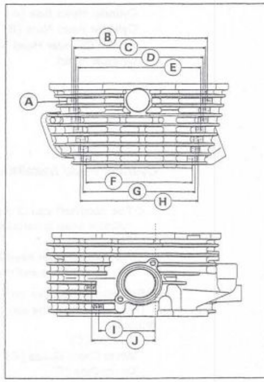
Cylinder Head Assembly

- ● Install the rubber dampers [A] between the fins [B] as shown.
- ○ The end of the damper should be recessed 3 ~ 5 mm [C] inside the top of the lower fin.



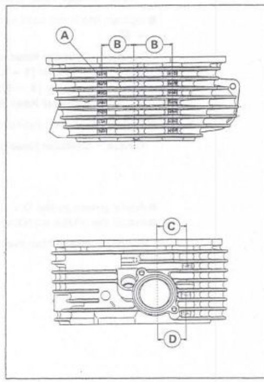
Front Cylinder Head:

[A] Rubber Dampers (16)
[B] 170 mm
[C] 165 mm
[D] 159 mm
[E] 154 mm
[F] 133 mm
[G] 140 mm
[H] 148 mm
[I] 70 mm
[J] 79 mm



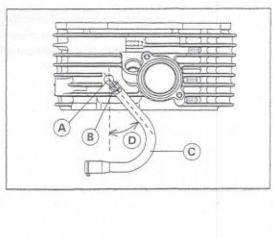
Rear Cylinder Head:

[A] Rubber Dampers (17)
[B] 40 mm
[C] 38 mm
[D] 36 mm



- When installing the breather pipe fitting [A] in the rear cylinder head, align the fitting with the mark [B].

[C] Fitting Hose
[D] 37 ~ 43°

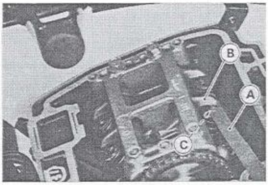


Valves

Valve Clearance Adjustment

NOTE

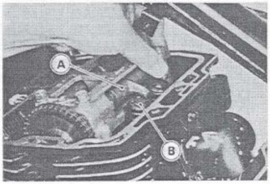
○ *Valve clearance must be checked and adjusted when the engine is cold (at room temperature).*



- Remove:
  Cylinder Head Cover (see Cylinder Head Cover Removal)
  Timing Inspection Cover (Engine Left Side)
- Set the front piston at TDC (see Camshaft Installation).
- Using a thickness gauge [A], measure the valve clearance between the rocker arm [B] and the shim [C].
- Set the rear piston at TDC by turning the crankshaft counterclockwise 305° (see Camshaft Installation).
- Using a thickness gauge, measure the valve clearance between the rocker arm and the shim.

Valve Clearance
Standard: IN: 0.10 ~ 0.15 mm
EX: 0.20 ~ 0.25 mm

★If the valve clearance is not within the specified range, first record the clearance, and then adjust it.



- To change the valve clearance, slide the rocker arm [A] sideways and change the shim [B]. Replace the shim with one of a different thickness.

NOTE

○ *Mark and record the shim locations so that the shims can be reinstalled in their original positions.*

- To select a new shim which brings the valve clearance within the specified range, refer to the Valve Clearance Adjustment Charts.

○ Remeasure any valve clearance that was adjusted. Readjust if necessary.

CAUTION

Do not put shim stock under the shim. This may cause the shim to pop out at high rpm, causing extensive engine damage.
Do not grind the shim. This may cause it to fracture, causing extensive engine damage.

VALVE CLEARANCE ADJUSTMENT CHART

INLET VALVE

	PRESENT SHIM												Example								
PART No. (92025 -)	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890
MARK	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	00
THICKNESS (mm)	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00
VALVE CLEARANCE MEASUREMENT																					
0.00 ~ 0.04	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90
0.05 ~ 0.09	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95
0.10 ~ 0.15	SPECIFIED CLEARANCE/NO CHANGE REQUIRED																				
0.16 ~ 0.20	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	
0.21 ~ 0.25 (Example)	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00		
0.26 ~ 0.30	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00			
0.31 ~ 0.35	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00				
0.36 ~ 0.40	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00					
0.41 ~ 0.45	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00						
0.46 ~ 0.50	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00							
0.51 ~ 0.55	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00								
0.56 ~ 0.60	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00									
0.61 ~ 0.65	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00										
0.66 ~ 0.70	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00											
0.71 ~ 0.75	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00												
0.76 ~ 0.80	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00													
0.81 ~ 0.85	2.70	2.75	2.80	2.85	2.90	2.95	3.00														
0.86 ~ 0.90	2.75	2.80	2.85	2.90	2.95	3.00															
0.91 ~ 0.95	2.80	2.85	2.90	2.95	3.00																
0.96 ~ 1.00	2.85	2.90	2.95	3.00																	
1.01 ~ 1.05	2.90	2.95	3.00																		
1.06 ~ 1.10	2.95	3.00																			
1.11 ~ 1.15	3.00																				

Parts No.	Thickness
92180-1208	1.95 mm
92180-1209	1.90 mm
92180-1210	1.85 mm
92180-1211	1.80 mm
92180-1212	1.75 mm
92180-1213	1.70 mm

The shim from 1.70 to 1.95 mm thick are also available.

INSTALL THE SHIM OF THIS THICKNESS (mm)

1. Measure the clearance (when engine is cold).
2. Check present shim size.
3. Match clearance in vertical column with present shim size in horizontal column.
4. Install the shim specified where the lines intersect. This shim will give the proper clearance.

   Example: Present shim is **2.60 mm**
   Measured clearance is **0.25 mm**
   Replace **2.60 mm** shim with **2.70 mm** shim.

5. Remeasure the valve clearance and readjust if necessary.

NOTE

○*If there is no clearance, select a shim which is several sizes smaller and then measure the clearance.*

VALVE CLEARANCE ADJUSTMENT CHART
EXHAUST VALVE

	PRESENT SHIM											←Example									
PART No. (92025-)	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890
MARK	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	00
THICKNESS (mm)	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00
VALVE CLEARANCE MEASUREMENT																					
0.00~0.04	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75
0.05~0.09	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80
0.10~0.14	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85
0.15~0.19	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90
0.20~0.25	SPECIFIED CLEARANCE/NO CHANGE REQUIRED																				
0.26~0.30	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00
0.31~0.35	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	
0.36~0.40	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00		
0.41~0.45	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00			
0.46~0.50 (←Example)	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00				
0.51~0.55	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00					
0.56~0.60	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00						
0.61~0.65	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00							
0.66~0.70	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00								
0.71~0.75	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00									
0.76~0.80	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00										
0.81~0.85	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00											
0.86~0.90	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00												
0.91~0.95	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00													
0.96~1.00	2.70	2.75	2.80	2.85	2.90	2.95	3.00														
1.01~1.05	2.75	2.80	2.85	2.90	2.95	3.00															
1.06~1.10	2.80	2.85	2.90	2.95	3.00																
1.11~1.15	2.85	2.90	2.95	3.00																	
1.16~1.20	2.90	2.95	3.00																		
1.21~1.25	2.95	3.00																			
1.26~1.30	3.00																				

INSTALL THE SHIM OF THIS THICKNESS (mm)

Parts No.	Thickness
92180-1208	1.95 mm
92180-1209	1.90 mm
92180-1210	1.85 mm
92180-1211	1.80 mm
92180-1212	1.75 mm
92180-1213	1.70 mm

The shim from 1.70 to 1.95 mm thick are also available.

GE15040BW4 C

4. Install the shim specified where the lines intersect. This shim will give the proper clearance.

   Example: Present shim is **2.55 mm.**
   Measured clearance is **0.50 mm.**
   Replace **2.55 mm** shim with **2.75 mm** shim.

5. Remeasure the valve clearance and readjust if necessary.

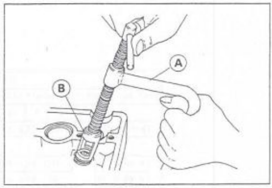
NOTE

○*If there is no clearance, select a shim which is several sizes smaller and then measure the clearance.*

Valve Removal

- Remove the cylinder head (see Cylinder Head Removal).
- Swing open the rocker arm, and then remove the shims.
- ○ Mark and record the shim locations so that the shims can be installed in their original positions.
- Using the valve spring compressor assembly, remove the valve.

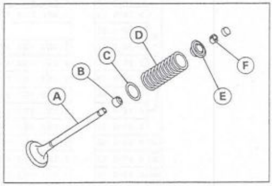
Special Tool – Valve Spring Compressor Assembly: 57001-241 [A]
Valve Spring Compressor Adapter, Φ22: 57001-1202 [B]



Valve Installation

- Replace the oil seal with a new one.
- Apply a thin coat of molybdenum disulfide grease to the valve stem before valve installation.

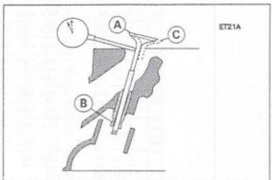
[A] Valve Stem
[B] Oil Seal
[C] Spring Seat
[D] Spring
[E] Retainer
[F] Split Keepers



Valve-to-Guide Clearance Measurement (Wobble Method)

If a small bore gauge is not available, inspect the valve guide wear by measuring the valve to valve guide clearance with the wobble method as indicated below.

- Insert a new valve [A] into the guide [B] and set a dial gauge against the stem perpendicular to it as close as possible to the cylinder head mating surface.
- Move the stem back and forth [C] to measure valve/valve guide clearance.
- ○ Repeat the measurement in a direction at a right angle to the first.
- ★ If the reading exceeds the service limit, replace the cylinder head unit.



NOTE

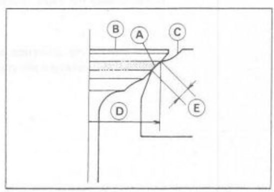
○ *The reading is not actual valve/valve guide clearance because the measuring point is above the guide.*

Valve/Valve Guide Clearance (Wobble Method)

	Standard	Service Limit
Inlet	0.03 ~ 0.12 mm	0.26 mm
Exhaust	0.10 ~ 0.18 mm	0.32 mm

Valve Seat Inspection

- Remove the valve (see Valve Removal).
- Check the valve seating surface [A] between the valve [B] and valve seat [C].
- ○ Measure the outside diameter [D] of the seating pattern on the valve seat.
- ★ If the outside diameter is too large or too small, repair the seat (see Seat Repair).



Valve Seating Surface Outside Diameter

Standard:	**Inlet**	**30.9 ~ 31.1 mm**
	Exhaust	**26.9 ~ 27.1 mm**

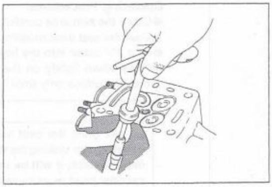
○ Measure the seat width [E] of the portion where there is no build-up carbon (white portion) of the valve seat with a vernier caliper.

★If the width is too wide, too narrow or uneven, repair the seat (see Valve Seat Repair).

Valve Seating Surface Width
Standard: Inlet, Exhaust 0.5 ~ 1.0 mm

Valve Seat Repair

● Repair the valve seat with the valve seat cutters.



Special Tool – Valve Seat Cutter Holder, Φ5: 57001-1208
Valve Seat Cutter Holder Bar: 57001-1128

[For Inlet Valve Seat]
Valve Seat Cutter, 45° – Φ32: 57001-1115
Valve Seat Cutter, 32° – Φ33: 57001-1199
Valve Seat Cutter, 60° – Φ33: 57001-1334
or Valve Seat Cutter, 55° – Φ35: 57001-1247

[For Exhaust Valve Seat]
Valve Seat Cutter, 45° – Φ30: 57001-1187
or Valve Seat Cutter, 45° – Φ32: 57001-1115
Valve Seat Cutter, 32° – Φ28: 57001-1119
or Valve Seat Cutter, 32° – Φ30: 57001-1120
Valve Seat Cutter, 60° – Φ30: 57001-1123

★If the manufacturer's instructions are not available, use the following procedure.

Seat Cutter Operation Care:

1. This valve seat cutter is developed to grind the valve for repair. Therefore the cutter must not be used for other purposes than seat repair.
2. Do not drop or shock the valve seat cutter, or the diamond particles may fall off.
3. Do not fail to apply engine oil to the valve seat cutter before grinding the seat surface. Also wash off ground particles sticking to the cutter with washing oil.

NOTE

○ *Do not use a wire brush to remove the metal particles from the cutter. It will take off the diamond particles.*

4. Setting the valve seat cutter holder in position, operate the cutter in one hand. Do not apply too much force to the diamond portion.

NOTE

○ *Prior to grinding, apply engine oil to the cutter and during the operation, wash off any ground particles sticking to the cutter with washing oil.*

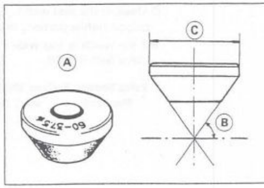
5. After use, wash it with washing oil and apply thin layer of engine oil before storing.

Marks Stamped on the Cutter:

The marks stamped on the back of the cutter [A] represent the following.

60° ....Cutter angle [B]

37.5Φ....................................Outer diameter of cutter [C]



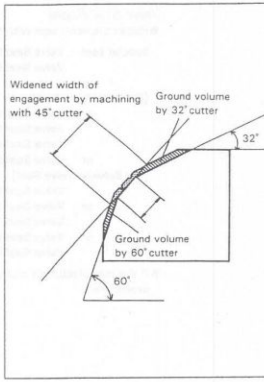
Operating Procedures:

● Clean the seat area carefully.

● Coat the seat with machinist's dye.

● Fit a 45° cutter into the holder and slide it into the valve guide.

● Press down lightly on the handle and turn it right or left. Grind the seating surface only until it is smooth.



CAUTION
Do not grind the seat too much. Overgrinding will reduce valve clearance by sinking the valve into the head. If the valve sinks too far into the head, it will be impossible to adjust the clearance, and the cylinder head must be replaced.

● Measure the outside diameter of the seating surface with a vernier caliper.

★ If the outside diameter of the seating surface is too small, repeat the 45° grind until the diameter is within the specified range.

★ If the outside diameter of the seating surface is too large, make the 32° grind described below.

★ If the outside diameter of the seating surface is within the specified range, measure the seat width as described below.

● Grind the seat at a 32° angle until the seat O.D. is within the specified range.

○ To make the 32° grind, fit a 32° cutter into the holder, and slide it into the valve guide.

○ Turn the holder one turn at a time while pressing down very lightly. Check the seat after each turn.

CAUTION
The 32° cutter removes material very quickly. Check the seat outside diameter frequently to prevent overgrinding.

○ After making the 32° grind, return to the seat O.D. measurement step above.

● To measure the seat width, use a vernier caliper to measure the width of the 45° angle portion of the seat at several places around the seat.

★ If the seat width is too narrow, repeat the 45° grind until the seat is slightly too wide, and then return to the seat O.D. measurement step above.

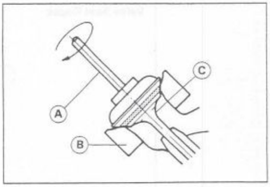
★ If the seat width is too wide, make the 60° grind described below.

★ If the seat width is within the specified range, lap the valve to the seat as described below.

● Grind the seat at a 60° angle until the seat width is within the specified range.

○ To make the 60° grind, fit 60° cutter into the holder, and slide it into the valve guide.

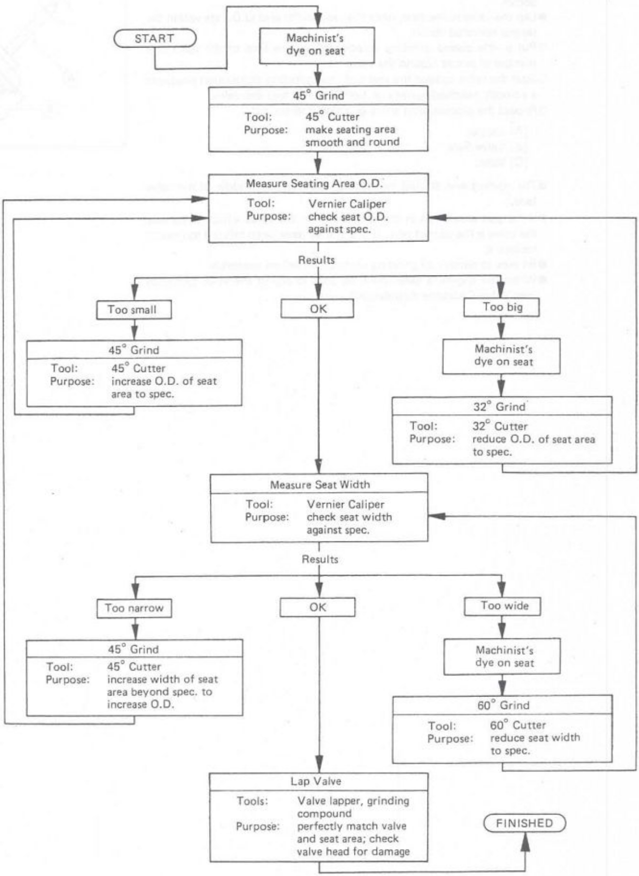
○ Turn the holder, while pressing down lightly.
○ After making the 60° grind, return to the seat width measurement step above.
● Lap the valve to the seat, once the seat width and O.D. are within the ranges specified above.
○ Put a little coarse grinding compound on the face of the valve in a number of places around the valve head.
○ Spin the valve against the seat until the grinding compound produces a smooth, matched surface on both the seat and the valve.
○ Repeat the process with a fine grinding compound.



[A] Lapper
[B] Valve Seat
[C] Valve

● The seating area should be marked about in the middle of the valve face.
★ If the seat area is not in the right place on the valve, check to be sure the valve is the correct part. If it is, it may have been refaced too much; replace it.
● Be sure to remove all grinding compound before assembly.
● When the engine is assembled, be sure to adjust the valve clearance (see Valve Clearance Adjustment).

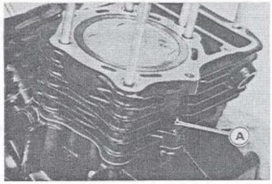
Valve Seat Repair



Cylinder, Pistons

Cylinder Removal

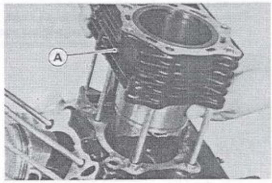
● Remove:
  Cylinder Head (see Cylinder Head Removal)
  Cylinder Nut [A]
  Cylinder



Cylinder Installation

● Install the new cylinder gasket.
● Set the piston at top position.
● Apply engine oil to the cylinder bore and piston skirt.
● Install the cylinder [A] so that the tensioner mounting hole faces rearward.
● Tighten the cylinder nut.

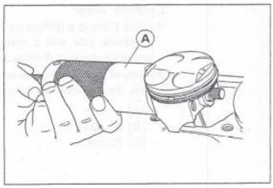
Torque – Cylinder Nuts: 25 N-m (2.5 kg-m, 18.0 ft-lb)



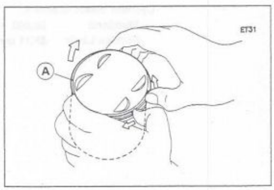
Piston Removal

● Remove the cylinder (see Cylinder Removal).
● Place a clean cloth under the piston and remove the piston pin snap ring.
● Remove the piston pin.

Special Tool – Piston Pin Puller Assembly: 57001-910 [A]

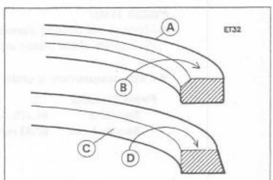


● Carefully spread the ring opening with your thumbs and then push up on the opposite side of the ring [A] to remove it.
● Remove the 3-piece oil ring with your thumbs in the same manner.

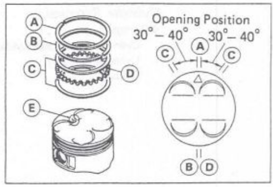


Piston Installation

● Do not mix up the top and second rings.
○ Install the top ring [A] so that the "R" mark [B] faces up.
○ Install the second ring [C] so that the "RN" mark [D] faces up.



- The piston ring openings must be positioned as shown in the figure. The openings of the oil ring steel rails must be about 30 – 45° of angle from the opening of the top ring.



[A] Top Ring
[B] Second Ring
[C] Oil Ring Steel Rails
[D] Oil Ring Expander
[E] Arrow

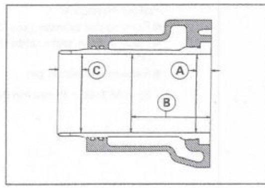
- The arrow on the piston head must point toward the exhaust side of the cylinder.

CAUTION
Do not reuse snap rings, as removal weakens and deforms them. They could fall out and score the cylinder wall.

Cylinder Wear

- Since there is a difference in cylinder wear in different directions, take a side-to-side and a front-to-back measurement at each of the 3 locations (total of 6 measurements) shown in the figure.

★If any of the cylinder inside diameter measurements exceeds the service limit, the cylinder will have to be bored to oversize and then honed.



[A] 10 mm
[B] 60 mm
[C] 20 mm

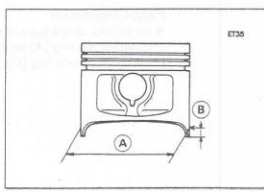
Cylinder Inside Diameter

Standard:	**88.000 ~ 88.012 mm**
Service Limit:	**88.11 mm**

Piston Wear

- Measure the outside diameter [A] of each piston 5 mm [B] up from the bottom of the piston at a right angle to the direction of the piston pin.

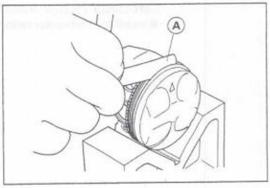
★If the measurement is under service limit, replace the piston.



Piston Diameter

Standard:	**87.975 ~ 87.990 mm**
Service Limit:	**87.83 mm**

Piston Ring, Piston Ring Groove Wear



- Check for uneven groove wear by inspecting the ring seating.

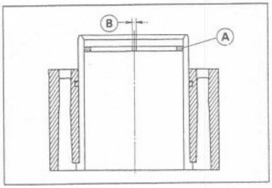
★The rings should fit perfectly parallel to groove surfaces. If not, the piston must be replaced.

- With the piston rings in their grooves, make several measurements with a thickness gauge [A] to determine piston ring/groove clearance.

Piston Ring/Groove Clearance

	Standard	Service Limit
Top	0.03 ~ 0.07 mm	0.17 mm
Second	0.02 ~ 0.06 mm	0.16 mm

Piston Ring End Gap



- Place the piston ring [A] inside the cylinder, using the piston to locate the ring squarely in place. Set it close to the bottom of the cylinder, where cylinder wear is low.
- Measure the gap [B] between the ends of the ring with a thickness gauge.

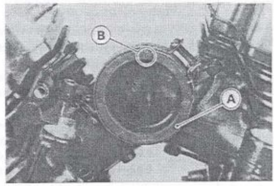
Piston Ring End Gap

	Standard	Service Limit
Top	0.25 ~ 0.40 mm	0.7 mm
Second	0.40 ~ 0.55 mm	0.9 mm

Carburetor Holder

Carburetor Holder Installation

- Install the carburetor holder [A] so that the up mark [B] faces upward.

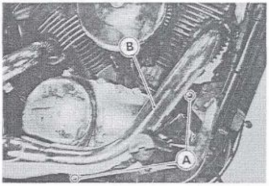


Muffler

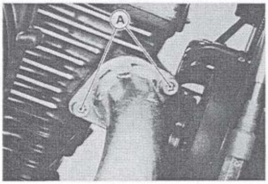
Muffler Removal

Front Muffler:

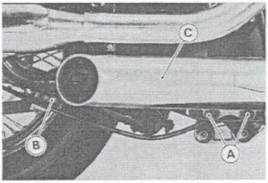
- Remove:
  Clamp Bolts [A] and Front Exhaust Pipe Cover [B]



  Exhaust Pipe Bolts [A]

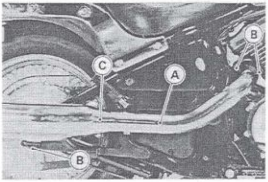


  Muffler Bolts [A]
  Clamp Bolt [B]
  Front Muffler [C]



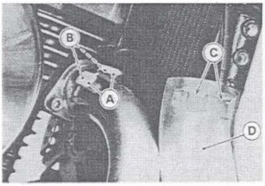
Rear Muffler:

- Remove:
  Front Muffler
  Rear Exhaust Pipe Cover [A]
  Exhaust Pipe Bolts [B]
  Rear Muffler [C]

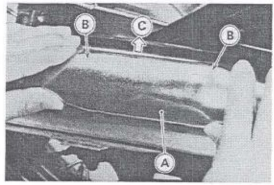


Muffler Installation

- Install the grommets [A] on the hook [B] of the exhaust pipe.
- Slip the hook into the brace [C] of the exhaust cover [D].



Muffler Cover Removal

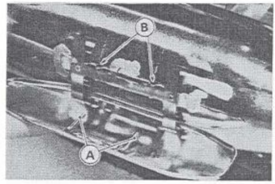


● Remove the muffler cover [A] from the muffler as follows:

○ Hold the both ends on the cover.

○ Push [B] the upper end of the cover and then slide up [C] the cover as shown.

Muffler Cover Installation



● Insert the pins [A] of the muffler cover into the holes [B] on the muffler.

NOTE

○ *Do not move the muffler cover to the front and rear.*

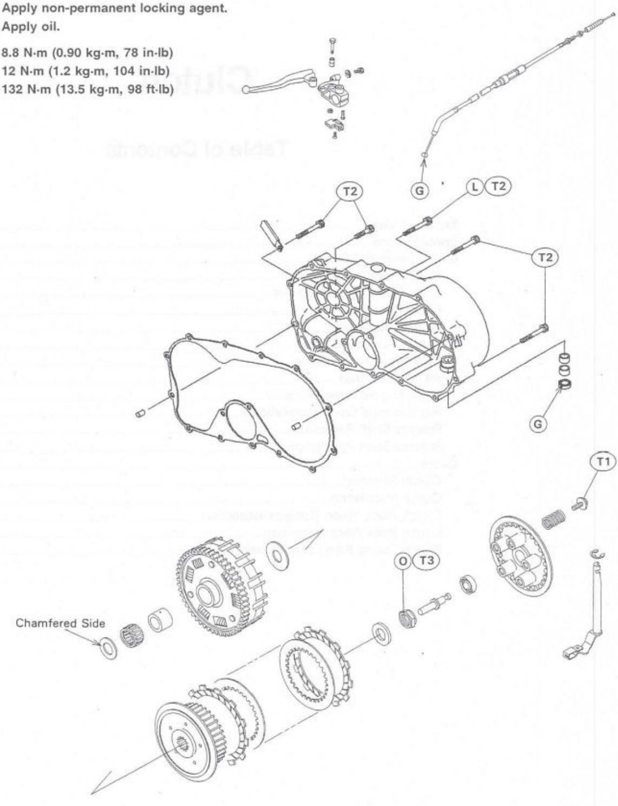
Clutch

Table of Contents

Exploded View

G: Apply grease.
L: Apply non-permanent locking agent.
O: Apply oil.

T1: 8.8 N·m (0.90 kg·m, 78 in·lb)
T2: 12 N·m (1.2 kg·m, 104 in·lb)
T3: 132 N·m (13.5 kg·m, 98 ft·lb)



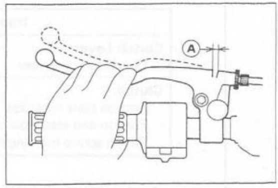
Specifications

Item	Standard	Service Limit
Clutch Lever:		
Clutch lever free play	2 ~ 3 mm	– – –
Clutch:		
Friction plate thickness	2.9 ~ 3.1 mm	2.8 mm
Friction and steel plate warp	0.2 mm or less	0.3 mm
Clutch spring free length	34.2 mm	33.1 mm

Special Tool – Clutch Holder: 57001-1243

Clutch Lever and Cable

Lever Free Play Inspection

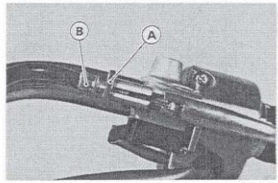


- Pull the clutch lever just enough to take up the free play [A].
- Measure the gap between the lever and the lever holder.

★If the gap is too wide, the clutch may not release fully. If the gap is too narrow, the clutch may not engage fully. In either case, adjust it.

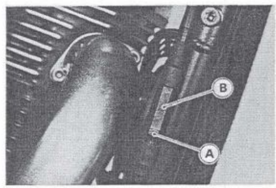
Clutch Lever Free Play
Standard: 2 ~ 3 mm

Lever Free Play Adjustment



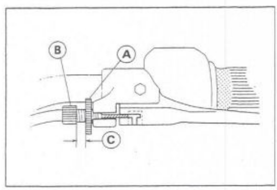
- Loosen the locknut [A] at the clutch lever.
- Turn the adjuster [B] until the proper amount of clutch lever free play is obtained.
- Tighten the locknut securely.

★If it cannot be done, use the adjuster at the middle of the cable.

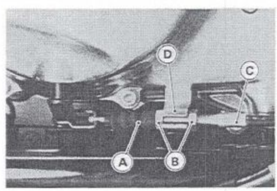


- Loosen the locknut [A] at the middle of the clutch cable.
- Turn the adjusting nut [B] until the proper amount of clutch lever free play is obtained.
- Tighten the locknut securely.

★If it cannot be done, use the mounting nuts at the lower end of the cable.



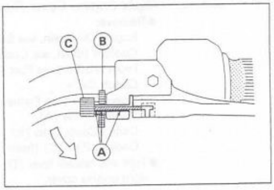
- Remove the front muffler (see Engine Top End chapter).
- Loosen the locknut [A] at the clutch lever.
- Turn the adjuster [B] so that 5 ~ 6 mm [C] of threads are visible.



- Slide the dust cover [A] at the clutch cable lower end out of place.
- Loosen both mounting nuts [B] at the clutch cover as far as they will go.
- Pull the clutch outer cable [C] tight and tighten the mounting nuts against the bracket [D].
- Slip the rubber dust cover back onto place.
- Turn the adjuster at the clutch lever until the free play is correct.
- Tighten the knurled locknut at the clutch lever.
- After the adjustment, start the engine and check that the clutch does not slip and that it releases properly.

Cable Removal

- Slide the dust cover at the clutch cable lower end out of place.
- Loosen the nuts, and slide the lower end of the clutch cable to give the cable plenty of play.
- Loosen the locknut at the clutch lever, and screw in the adjuster.
- Line up the slots [A] in the clutch lever, locknut [B], and adjuster [C], and then free the cable from the lever.
- Free the clutch inner cable tip from the clutch release lever.
- Push the release lever toward the front of the motorcycle and tape the release lever to the clutch cover to prevent the release shaft from falling out.
- Pull the clutch cable out of the frame.



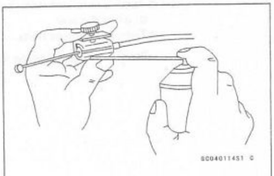
Cable Installation

- Run the clutch cable correctly (see General Information chapter).
- Adjust the clutch cable (see Lever Free Play Adjustment).

Cable Lubrication

Whenever the clutch cable is removed, lubricate the clutch cable as follows.

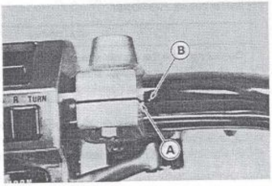
- Apply a thin coating of grease to the cable upper and lower ends.
- Lubricate the cable with a penetrating rust inhibitor.



GC04011451 C

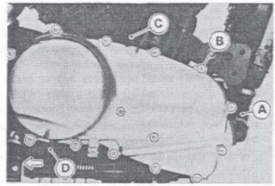
Clutch Lever Installation

- Install the clutch lever so that the mating surface [A] of the lever holder is aligned with the punch mark [B] on the handlebar.



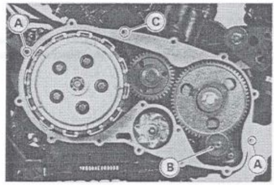
Right Engine Cover

Right Engine Cover Removal

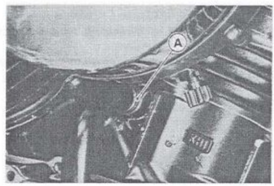


- Remove:
  Engine Oil (drain, see Engine Lubrication System chapter)
  Coolant (drain, see Cooling System chapter)
  Front Muffler (see Fuel System chapter)
  Clutch Cable
  Down Tube (see Frame chapter)
  Coolant Hose [A]
  Clutch Cover Bolts [B]
  Coolant Pipe [C] (from the engine)
- Turn the release lever [D] toward the rear as shown, and remove the right engine cover.

Right Engine Cover Installation



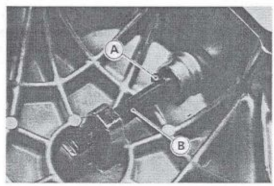
- Install the knock pins [A], and replace the cover gasket with a new one.
- Check to see that the washer [B] is in place.
- Apply a non-permanent locking agent to the threads of the right engine cover bolt [C].



- Apply a soap and water solution to the seal [A]. Do not apply a grease or oil to the seal.
- Tighten the cover bolts.

Torque – Right Engine Cover Bolts: 12 N·m (1.2 kg·m, 104 in·lb)

Release Shaft Removal



CAUTION
Do not remove the clutch release lever and shaft assembly unless it is absolutely necessary. If removed, the oil seal replacement may be required.

- Remove the right engine cover (see Right Engine Cover Removal).
- Remove the circlip [A] from the release shaft.
- Pull the lever and shaft assembly [B] out of the right engine cover.

Release Shaft Installation

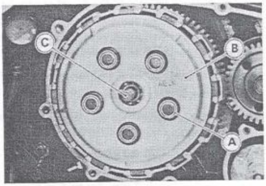
- Apply high-temperature grease to the oil seal lips on the lower ridge of the clutch cover.
- Apply oil to the bearings in the hole of the right engine cover.
- Insert the release shaft straight into the lower hole of the right engine cover.

CAUTION
When inserting the release shaft, be careful not to remove the spring of the oil seal.

Clutch

Clutch Removal

● Remove:
Right Engine Cover (see Right Engine Cover Removal)
Clutch Spring Bolts [A]
Clutch Springs
Clutch Spring Plate [B] (with thrust bearing and pusher [C])

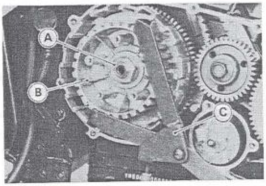


Friction Plates, Steel Plates
Clutch Hub Nut [A]

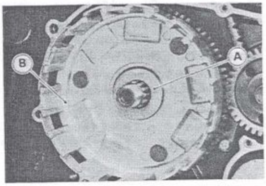
○ Holding the clutch hub [B], remove the nut.

Special Tool – Clutch Holder: 57001-1243 [C]

● Remove:
Clutch Hub

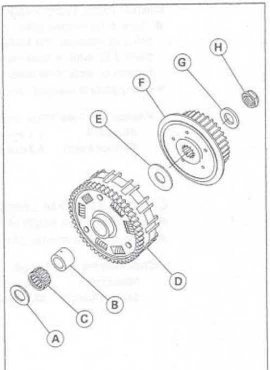


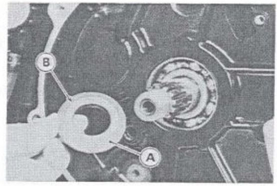
Spacer [A]
Clutch Housing [B], Needle Bearing and Bushing
Thrust Spacer



Clutch Installation

● Install the following parts on the drive shaft.
[A] Thrust Spacer
[B] Bushing
[C] Needle Bearing
[D] Clutch Housing
[E] Spacer
[F] Clutch Hub
[G] Washer
[H] Nut





○ Install the thrust spacer [A] so that the stepped side [B] faces inward.
○ Replace the clutch hub nut with a new one.
○ Apply oil to the threads and seating surface of the hub nut.
○ Holding the clutch hub, tighten the clutch hub nut.

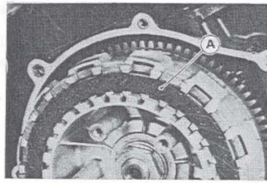
Special Tool – Clutch Holder: 57001–1243

Torque – Clutch Hub Nut: 132 N·m (13.5 kg·m, 98 ft·lb)

● Install the friction plates and steel plates, starting with a friction plate and alternating them.

CAUTION

If new dry friction plates and steel plates are installed, apply engine oil to the surfaces of each plate to avoid clutch plate seizure.

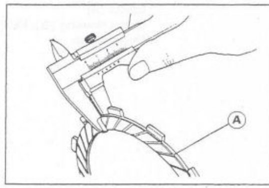


○ Install the last friction plate [A] fitting the tangs in the grooves in the housing as shown.
● Install the clutch spring plate and spring, and tighten the clutch spring bolts.

Torque – Clutch Spring Bolts: 8.8 N-m (0.90 kg-m, 78 in-lb)

● Install the right engine cover (see Right Engine Cover Installation).

Clutch Plate, Wear, Damage Inspection

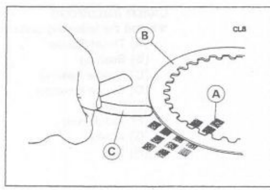


● Visually inspect the friction and steel plates for signs of seizure, overheating (discoloration), or uneven wear.
● Measure the thickness of the friction plate [A] at several points.
★ If any plates show signs of damage, or if they have worn past the service limit, replace them with new ones.

Friction Plate Thickness

Standard:	**2.9 ~ 3.1 mm**
Service Limit:	**2.8 mm**

Clutch Plate Warp Inspection

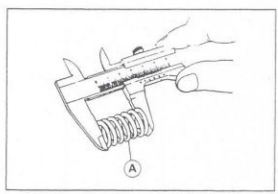


● Place each friction plate or steel plate on a surface plate and measure the gap between the surface plate [A] and each friction plate or steel plate [B] with a thickness gauge [C]. The gap is the amount of friction or steel plate warp.
★ If any plate is warped over the service limit, replace it with a new one.

Friction and Steel Plate Warp

Standard:	**0.2 mm or less**
Service Limit:	**0.3 mm**

Clutch Spring Free Length Measurement



● Measure the free length of the clutch springs [A].
★ If any spring is shorter than the service limit, it must be replaced.

Clutch Spring Free Length

Standard:	**34.2 mm**
Service Limit:	**33.1 mm**

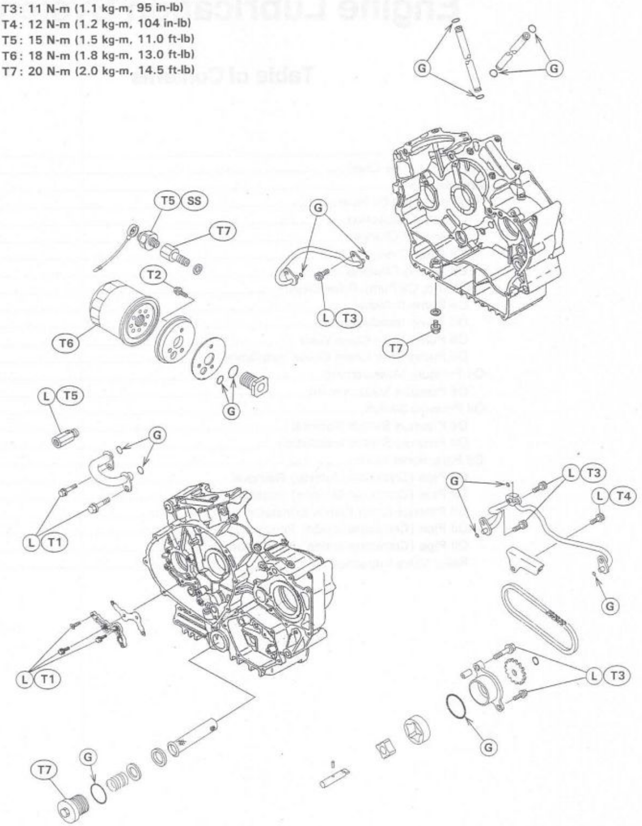
Engine Lubrication System

Table of Contents

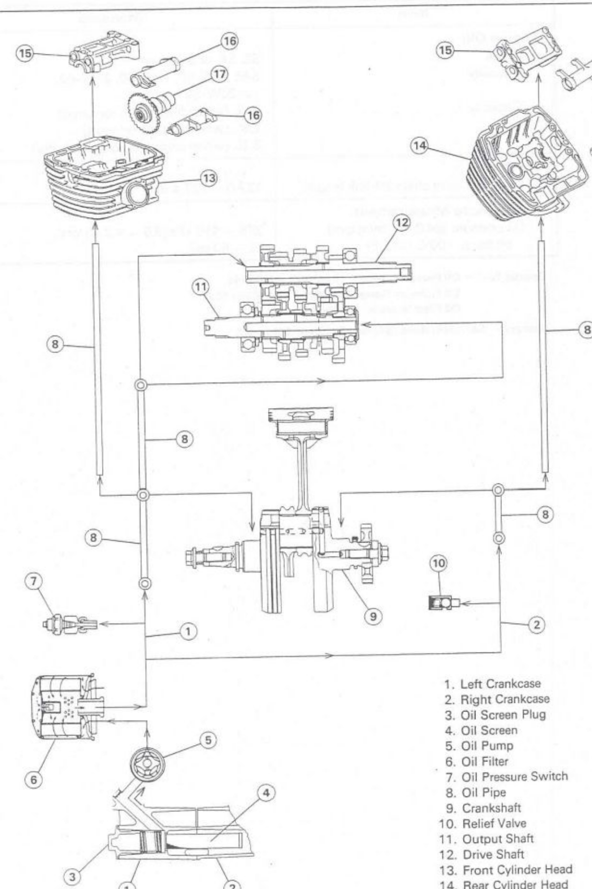
Exploded View

G : Apply grease.
L : Apply non-permanent locking agent.
SS: Apply silicone sealant.

T1: 5.4 N-m (0.55 kg-m, 48 in-lb)
T2: 7.8 N-m (0.80 kg-m, 69 in-lb)
T3: 11 N-m (1.1 kg-m, 95 in-lb)
T4: 12 N-m (1.2 kg-m, 104 in-lb)
T5: 15 N-m (1.5 kg-m, 11.0 ft-lb)
T6: 18 N-m (1.8 kg-m, 13.0 ft-lb)
T7: 20 N-m (2.0 kg-m, 14.5 ft-lb)



Engine Oil Flow Chart



1. Left Crankcase
2. Right Crankcase
3. Oil Screen Plug
4. Oil Screen
5. Oil Pump
6. Oil Filter
7. Oil Pressure Switch
8. Oil Pipe
9. Crankshaft
10. Relief Valve
11. Output Shaft
12. Drive Shaft
13. Front Cylinder Head
14. Rear Cylinder Head
15. Camshaft Cap
16. Rocker Arm
17. Camshaft

Specifications

Item	Standard	Service Limit
Engine Oil:		
Grade	SE, SF, or SG class	– – –
Viscosity	SAE 10W-40, 10W-50, 20W-40, or 20W-50	– – –
Capacity:	2.7L (when filter is not removed)	– – –
	2.9L (when filter is removed)	– – –
	3.2L (when engine is completely dry)	– – –
Oil Pump:		
Oil pump drive chain 20-link length	127.0 ~ 127.4 mm	128.9 mm
Oil Pressure Measurement:		
Oil pressure @4,000 r/min (rpm), oil temp. 100°C (212°F)	355 ~ 410 kPa (3.6 ~ 4.2 kg/cm², 51 ~ 60 psi)	– – –

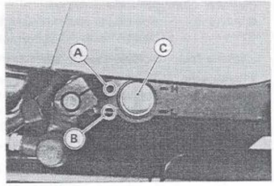
Special Tool – Oil Pressure Gauge, 10 kg/cm²: 57001-164
Oil Pressure Gauge Adapter, PT ⅛: 57001-1033
Oil Filter Wrench: 57001-1249

Sealant – Kawasaki Bond (Silicone Sealant): 56019-120

Engine Oil and Oil Filter

⚠WARNING

Motorcycle operation with insufficient, deteriorated, or contaminated engine oil will cause accelerated wear and may result in engine or transmission seizure, accident, and injury.



Oil Level Inspection

- Check that the engine oil level is between the upper [A] and lower [B] level lines next to the gauge [C].

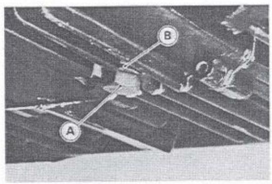
NOTE

- *Situate the motorcycle so that it is perpendicular to the ground.*
- *If the motorcycle has just been used, wait several minutes for all the oil to drain down.*
- *If the oil has just been changed, start the engine and run it for several minutes at idle speed. This fills the oil filter with oil. Stop the engine, then wait several minutes until the oil settles.*

CAUTION

Racing the engine before the oil reaches every part can cause engine seizure.
If the engine oil gets extremely low or if the oil pump or oil passages clog up or otherwise do not function properly, the oil pressure warning light will light. If this light stays on when the engine is running above the idle speed, stop the engine immediately and find the cause.

Engine Oil Change



- Support the motorcycle perpendicular to the ground after warming up the engine.
- Remove the engine drain plug [A] to drain the oil.
- ○The oil in the oil filter can be drained by removing the filter (see Oil Filter Change).
- ★Replace the drain plug gasket [B] with a new one if it is damaged.
- Tighten the drain plug.

Torque − Engine Drain Plug: 20 N-m (2.0 kg-m, 14.5 ft-lb)

- Pour in the specified type and amount of oil.

Engine Oil

Grade:	**SE, SF, or SG class**
Viscosity:	**SAE 10W40, 10W50, 20W40, or 20W50**
Amount:	**2.7 L (when filter is not removed)**
	2.9 L (when filter is removed)
	3.2 L (when engine is completely dry)

Oil Filter Change

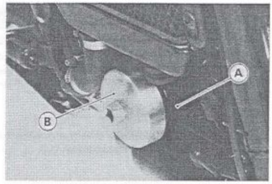
●Drain the engine oil (see Engine Oil Change).
●Remove the oil filter [A] with the oil filter wrench [B].

Special Tool – Oil Filter Wrench: 57001-1249

●Replace the filter with a new one.
●Apply engine oil to the gasket before installation.
●Tighten the filter with the oil filter wrench or with hands about ¾ turns after the gasket contacts the mounting surface of the oil filter plate.

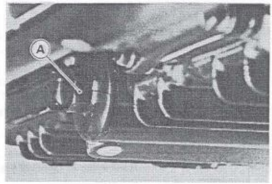
Torque – Oil Filter: 18 N-m (1.8 kg-m, 13.0 ft-lb)

●Pour in the specified type and amount of oil (see Engine Oil Change).



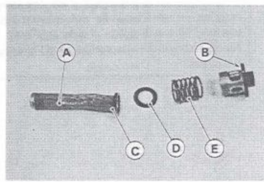
Oil Screen Cleaning

●Drain the engine oil (see Engine Oil Change).
●Remove the oil screen plug [A], spring, and washer.



●Pull out the oil screen [A].
●Clean the screen with high flash-point solvent.
●Check the screen carefully for any damage.
★If the screen is damaged, replace it with a new one.
●Check the O-ring [B] on the oil screen plug for damage.
★If the O-ring is damaged, replace it with a new one.
●Install:
Oil Screen and Rubber Gasket [C]
Washer [D]
Spring [E]
●Apply grease to the O-ring, and tighten the plug.

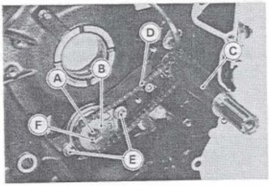
Torque – Oil Screen Plug : 20 N-m (2.0 kg-m, 14.5 ft-lb)



Oil Pump, Oil Pump Drive Chain

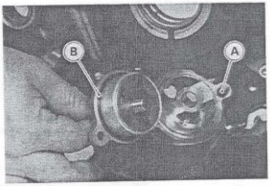
Oil Pump Removal

- Split the crankcase (see crankshaft/Transmission chapter).
- Remove:
  - Crankshaft
  - Circlip [A]
- Remove the sprocket [B] and balancer shaft [C] along with the oil pump chain [D].
- Remove:
  - Oil Pump Mounting Bolts [E]
  - Oil Pump Shaft [F], Pump Body, and Rotors



Oil Pump Installation

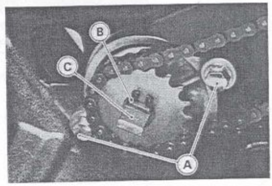
- Check that the knock pin [A] is in place.
- Apply grease to the O-ring [B] on the pump body.



- Apply a non-permanent locking agent to the threads of the mounting bolts [A], and tighten them.

Torque − Oil Pump Mounting Bolts : 11 N-m (1.1 kg-m, 95 in-lb)

- Install a new circlip [B] on the shaft so that the sharp edge faces away from the sprocket and opening is on the shaft flat surface [C].



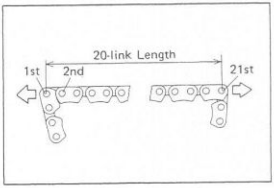
Oil Pump Drive Chain Wear

- Hold the chain taut with a force of about 5 kg in some manner, and measure a 20-link length. Since the chain may wear unevenly, take measurement at several places.

★If any measurement exceeds the service limit, replace the chain.

Oil Pump Drive Chain 20-link Length

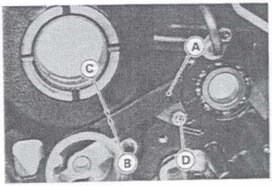
Standard:	**127.0 ~ 127.4 mm**
Service Limit:	**128.9 mm**



Oil Pump Drive Chain Guide Installation

- Install the chain guide [A] so that the upper surface [B] of the chain guide touches the flat surface [C] of the left crankcase.
- Apply a non-permanent locking agent to the threads of the chain guide bolt [D], and tighten it.

Torque − Oil Pump Drive Chain Guide Bolt : 12 N-m (1.2 kg-m, 104 in-lb)

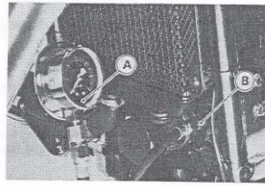


Oil Pressure Measurement

Oil Pressure Measurement

- Remove the oil pressure switch (see Oil Pressure Switch Removal) without draining the engine oil.
- Install the gauge and adapter.

Special Tool – Oil Pressure Gauge, 10 kg/cm²: 57001-164 [A]
Oil Pressure Gauge Adapter, PT ⅛: 57001-1033 [B]



- Run the engine at the specified speed, and read the oil pressure gauge.

★If the oil pressure is significantly below the specification, inspect the oil pump and relief valve.

★If the oil pump and relief valve are not at fault, inspect the rest of the lubrication system.

Oil Pressure
Standard: 355 ~ 410 kPa (3.6 ~ 4.2 kg/cm², 51 ~ 60 psi) @4,000 r/min (rpm), oil temp. 100°C (212 °F)

- Stop the engine.
- Remove the oil pressure gauge and adapter.

⚠WARNING

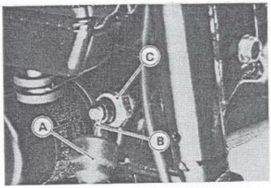
Take care against burns from hot engine oil that will drain through the oil passage when the gauge adapter is removed.

- Install the oil pressure switch (see Oil Pressure Switch Installation).

Oil Pressure Switch

Oil Pressure Switch Removal

- Remove:
  Engine Oil (drain, see Engine Oil Change)
  Switch Cover [A]
  Switch Lead Terminal [B]
  Oil Pressure Switch [C]



Oil Pressure Switch Installation

- Apply silicone sealant to the threads of the oil pressure switch, and tighten it.

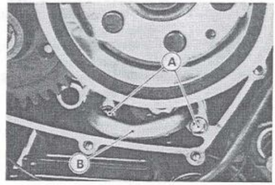
Sealant – Kawasaki Bond (Silicone Sealant): 56019-120

Torque – Oil Pressure Switch: 15 N-m (1.5 kg-m, 11.0 ft-lb)

Oil Pipe, Relief Valve

Oil Pipe (Crankcase Outside) Removal

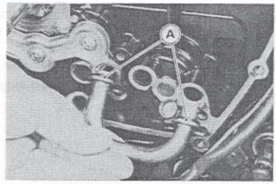
● Remove
  Alternator Cover (see Electrical System chapter)
  Oil Pipe Mounting Bolts [A]
  Oil Pipe [B]



Oil Pipe (Crankcase Outside) Installation

● Apply grease to the O-rings [A].
● Apply a non-permanent locking agent to the threads of the mounting bolts, and tighten them.

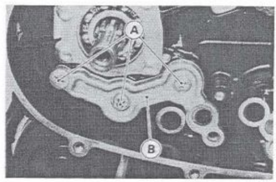
Torque – Oil Pipe Mounting Bolts (Crankcase Outside) : 5.4 N-m (0.55 kg-m, 48 in-lb)



Oil Passage Cover Removal/Installation

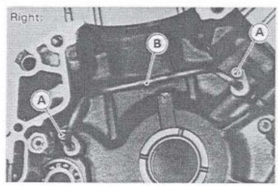
● Remove:
  Oil Pipe (Crankcase Outside)
  Alternator (see Electrical System chapter)
  Left Balancer (see Crankshaft/Transmission chapter)
  Oil Passage Cover Screws [A]
  Oil Passage Cover [B]
● Install a new gasket.
● Apply a non-permanent locking agent to the threads of the cover screws, and tighten them.

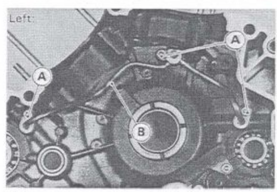
Torque – Oil Passage Cover Screws : 5.4 N-m (0.55 kg-m, 48 in-lb)



Oil Pipe (Crankcase Inside) Removal

● Split the crankcase (see Crankshaft/Transmission chapter).
● Remove:
  Oil Pipe Mounting Bolts [A]
  Oil Pipes [B]

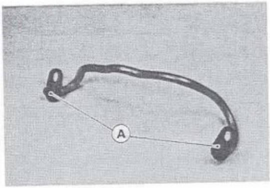




Oil Pipe (Crankcase Inside) Installation

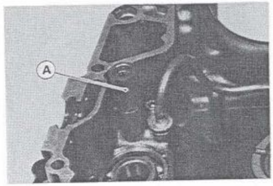
- Apply grease to the O-rings [A].
- Apply a non-permanent locking agent to the threads of the mounting bolts, and tighten them.

Torque – Oil Pipe Mounting Bolts (Crankcase Inside) : 11 N-m (1.1 kg-m, 95 in-lb)



Relief Valve Inspection

- Split the crankcase (see Crankshaft/Transmission chapter).
- Remove the relief valve [A] from the right crankcase.
- Check to see if the steel ball inside the valve slides smoothly when pushing it in with a wooden or other soft rod, and see if it comes back to its seat by valve spring pressure.



NOTE

○ *Inspect the valve in its assembled state. Disassembly and assembly may change the valve performance.*

★If any rough spots are found during above inspection, wash the valve clean with a high flash-point solvent and blow out any foreign particles that may be in the valve with compressed air.

⚠WARNING

Clean the parts in a well-ventilated area, and take care that there are no sparks or flame anywhere near the working area. Because of the danger of highly flammable liquids, do not use gasoline or low flash-point solvents.

★If cleaning does not solve the problem, replace the relief valve as an assembly. The relief valve is precision made with no allowance for replacement of individual parts.

- Apply a non-permanent locking agent to the threads of the relief valve, and tighten it.

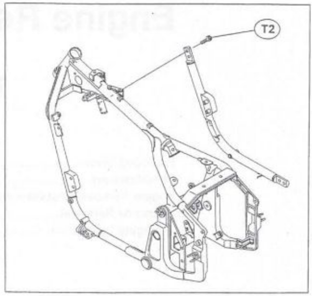
Torque – Oil Pressure Relief Valve : 15 N-m (1.5 kg-m, 11.0 ft-lb)

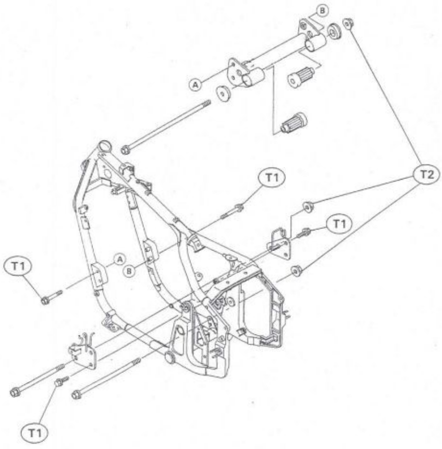
Engine Removal / Installation

Table of Contents

Exploded View

T1: 23 N-m (2.3 kg-m, 16.5 ft-lb)
T2: 44 N-m (4.5 kg-m, 33 ft-lb)





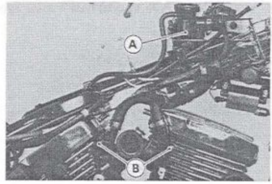
Specifications

Special Tool – Jack: 57001-1238

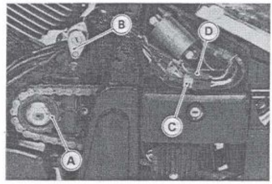
Engine Removal/Installation

Engine Removal

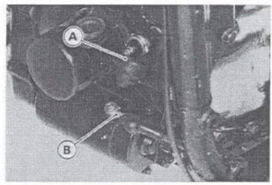
● Remove:.
  Engine Oil (drain, see Engine Lubrication System chapter)
  Coolant (drain, see Cooling System chapter)
  Fuel Tank (see Fuel System chapter)
  Muffler (see Engine Top End chapter)
  Air Cleaner Housing (see Fuel System chapter)
  Carburetor (see Fuel System chapter)
  Vacuum Switch Valve
  Radiator (see Cooling System chapter)
  Thermostat Housing [A]
  Water Hose Fitting Bolts [B] and Fittings



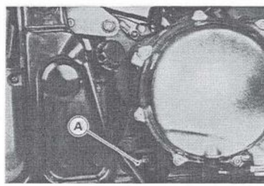
  Engine Sprocket [A] (see Final Drive chapter)
  Ignition Switch [B]
  Alternator Lead Connector [C]
  Pickup Coil Lead Connector [D]



  Oil Pressure Switch Lead [A]
  Starter Motor Lead [B]



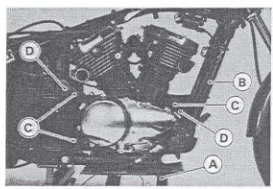
  Neutral Switch Lead Connector [A]



● Support the frame with the jack.

Special Tool – Jack: 57001-1238

● Squeeze the brake lever and hold it with a band.
● Support the engine with a stand [A].
● Remove:
  Clutch Cable
  Down Tube [B] (see Frame chapter)
  Engine Mounting Bolts [C] and Nuts
  Engine Mounting Bracket [D]
● Using the stand, take out the engine to the right.



Engine Installation

- Install the engine mounting bracket and down tube.

Torque – Engine Mounting Bracket Bolt : 23 N-m (2.3 kg-m, 16.5 ft-lb)
Down Tube Mounting Bolts : 44 N-m (4.5 kg-m, 33 ft-lb)

- Tighten the engine mounting bolts and nuts.

Torque – Engine Mounting Bolts and Nuts: 44 N-m (4.5 kg-m, 33 ft-lb)

- Install the removed parts (see appropriate chapters).
- Adjust:
  Throttle Cables (see Fuel System chapter)
  Drive Chain (see Final Drive chapter)

Crankshaft / Transmission

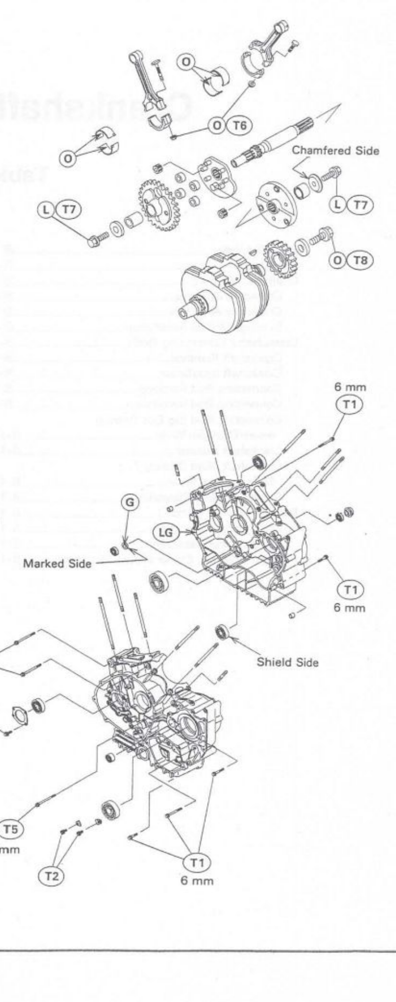
Table of Contents

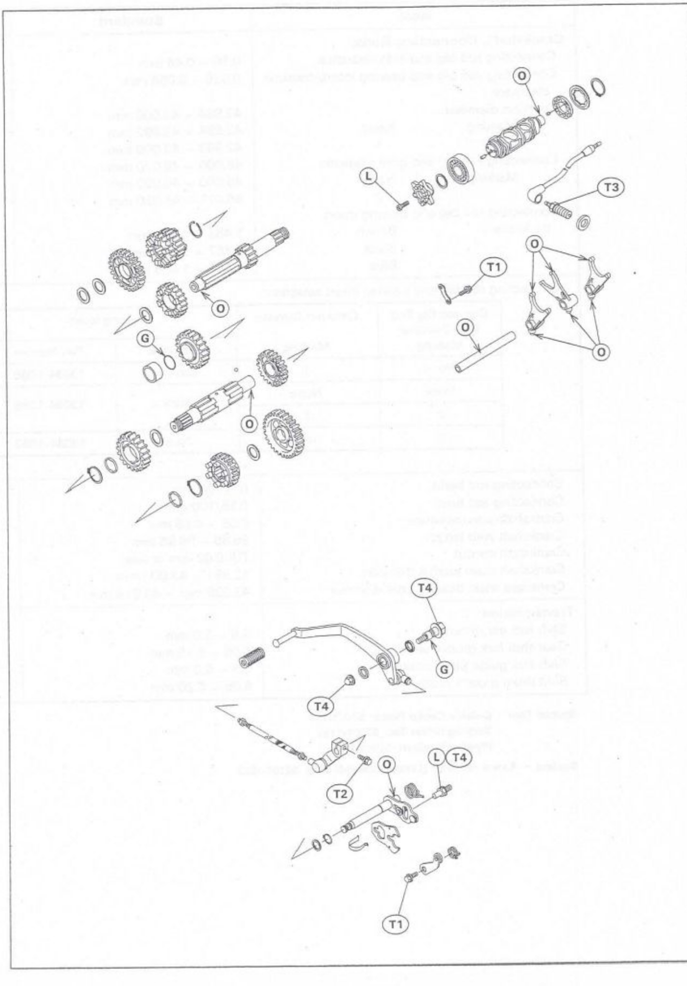
8

Exploded View

G: Apply grease.
L: Apply non-permanent locking agent.
LG: Apply Liquid gasket.
O: Apply oil.
S: Follow specified tightening sequence.

T1: 11 N·m (1.1 kg·m, 95 in·lb)
T2: 12 N·m (1.2 kg·m, 104 in·lb)
T3: 15 N·m (1.5 kg·m, 11.0 ft·lb)
T4: 29 N·m (3.0 kg·m, 22 ft·lb)
T5: 39 N·m (4.0 kg·m, 29 ft·lb)
T6: 46 N·m (4.7 kg·m, 34 ft·lb)
T7: 69 N·m (7.0 kg·m, 51 ft·lb)
T8: 157 N·m (16.0 kg·m, 115 ft·lb)
T9: 34 N·m (3.5 kg·m, 25 ft·lb)




O
L
T3
O
T1
O
O
G
O
O
T4
G
T4
L
T4
O
T2
T1

Specifications

Item	Standard	Service Limit
Crankshaft, Connecting Rods:		
Connecting rod big end side clearance	0.16 ~ 0.46 mm	0.70 mm
Connecting rod big end bearing insert/crankpin clearance	0.026 ~ 0.054 mm	0.09 mm
Crankpin diameter:	42.984 ~ 43.000 mm	42.97 mm
Marking None	42.984 ~ 42.992 mm	– – –
1	42.993 ~ 43.000 mm	– – –
Connecting rod big end bore diameter:	46.000 ~ 46.020 mm	– – –
Marking None	46.000 ~ 46.020 mm	– – –
○	46.011 ~ 46.020 mm	– – –
Connecting rod big end bearing insert thickness: Brown	1.483 ~ 1.487 mm	– – –
Black	1.487 ~ 1.491 mm	– – –
Blue	1.491 ~ 1.495 mm	– – –

Connecting rod big end bearing insert selection:

Con-rod Big End Bore Diameter Marking	Crankpin Diameter Marking	Bearing Insert Size Color	Bearing Insert Part Number
None	1	Brown	13034-1059
None	None	Black	13034-1058
○	1	Black	13034-1058
○	None	Blue	13034-1057

Item	Standard	Service Limit
Connecting rod bend	0.1/100 mm	0.2/100 mm
Connecting rod twist	0.15/100 mm	0.2/100 mm
Crankshaft side clearance	0.05 ~ 0.55 mm	0.75 mm
Crankshaft web length	96.85 ~ 96.95 mm	96.6 mm
Crankshaft runout	TIR 0.02 mm or less	TIR 0.05 mm
Crankshaft main journal diameter	42.984 ~ 43.000 mm	42.96 mm
Crankcase main bearing bore diameter	43.025 mm ~ 43.014 mm	43.09 mm
Transmission:		
Shift fork ear thickness	4.9 ~ 5.0 mm	4.8 mm
Gear shift fork groove width	5.05 ~ 5.15 mm	5.2 mm
Shift fork guide pin diameter	5.9 ~ 6.0 mm	5.8 mm
Shift drum groove width	6.05 ~ 6.20 mm	6.3 mm

Special Tool – Outside Circlip Pliers: 57001-144
Bearing Driver Set: 57001-1129
Flywheel Holder: 57001-1313

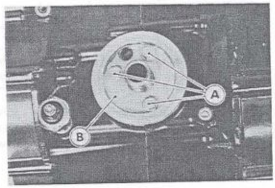
Sealant – Kawasaki Bond (Liquid Gasket-Black): 92104-1003

Crankcase Splitting

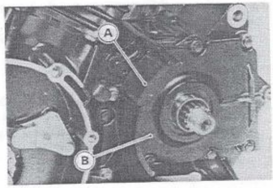
Crankcase Splitting

- Remove the engine (see Engine Removal/Installation chapter).
- Set the engine on a clean surface and hold the engine steady while parts are being removed.
- Remove:

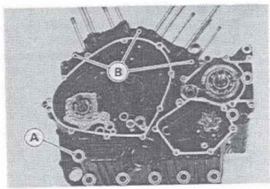
  Starter Motor (see Electrical System chapter)
  Oil Filter (see Engine Lubrication System chapter)
  Plate Bolts [A]
  Oil Filter Plate [B] and O-rings (2)



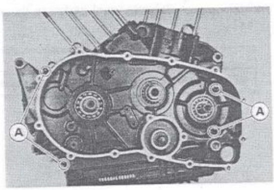
  Clutch (see Clutch chapter)
  Primary Gear (see Primary Gear Removal)
  Right Balancer (see Right Balancer, Starter Clutch Removal)
  Torque Limiter
  Water Pump Impeller (see Cooling System chapter)
  Left Balancer (see Left Balancer Removal)
  Alternator Rotor (see Electrical System chapter)
  External Shift Mechanism (see External Shift Mechanism Removal)
  Damper [A] and Transmission Cover [B]



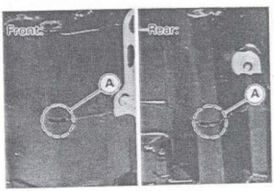
  Cylinder Heads, Cylinders, and Pistons (see Engine Top End chapter)
  Left Crankcase Bolts:
   6 mm Bolts [A]
   10 mm Bolts [B]



  Right Crankcase Bolts:
   6 mm Bolts [A]



- Put the engine so that the left crankcase is down.
- Pry the points [A] to split the crankcase halves apart, and remove the right crankcase half.

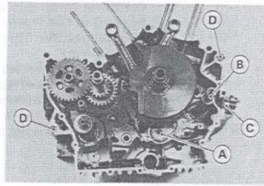


Crankcase Assembly

CAUTION
The right and left crankcase halves are machined at the factory in the assembled state, so the crankcase halves must be replaced as a set.

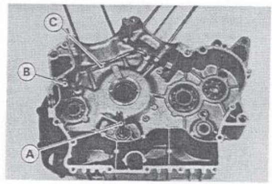
- With a high-flash point solvent, clean off the mating surfaces of the crankcases halves and wipe dry.
- Using compressed air, blow out the oil passages in the crankcase halves.

- Check to see that the following parts are in place.



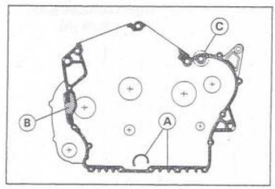
Left Crankcase:

Oil Pipe (Crankcase Inside)
Oil Pump [A]
Balancer Shaft [B]
Shift Drum
Transmission Shafts and Gears
Shift Forks and Shift Rods
Crankshaft and Connecting Rods
Oil Filter Adapter Bolt [C]
Knock Pins [D]



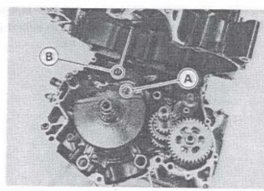
Right Crankcase:

Water Pump Shaft [A]
Relief Valve [B]
Oil Pipe (Crankcase Inside) [C]



- Apply liquid gasket to the mating surface [A] of the right crankcase half.

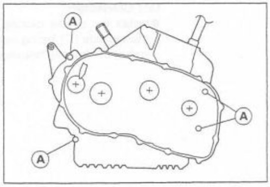
CAUTION
Do not apply liquid gasket to the oil passage [B] and hole [C].



- Install the right crankcase, fitting the oil pump shaft projection [A] into the water pump shaft slot [B].

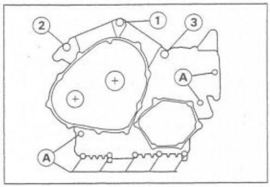
●Tighten the crankcase bolts as follows:
○Tighten the right crankcase half 6 mm bolts [A].

Torque – Crankcase Bolts (6 mm): 11 N-m (1.1 kg-m, 95 in-lb)



○Tighten the left crankcase half 10 mm bolts [1 ~ 3] to the tightening sequence, and then tighten the 6 mm bolts [A].

Torque – Crankcase Bolts (10 mm): 39 N-m (4.0 kg-m, 29 ft-lb)
Crankcase Bolts (6 mm): 11 N-m (1.1 kg-m, 95 in-lb)

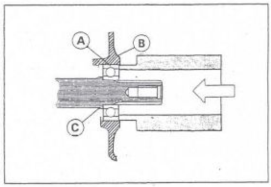


●After tightening all crankcase bolts, check the following items.
○Drive shaft and output shaft turn freely.
○While spinning the output shaft, gears shift smoothly from the 1st to 5th gear, and 5th to 1st.
○When the output shaft stays still, the gear can not be shifted to 2nd gear or other higher gear positions.

Bearing, Oil Seal Installation

●When installing a bearing other than the following parts, press it in with the marked side facing out.

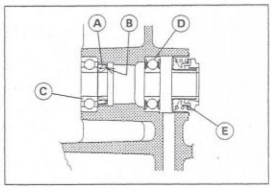
Special Tool – Bearing Driver Set: 57001-1129



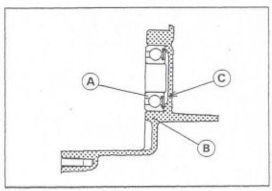
Right Crankcase:

●Install the right balancer bearing [A] as follows:
○Temporarily press the bearing into the right crankcase until it is leveled with the outboard end of the bearing housing [B].
○After installing the left balancer (see Left Balancer Installation), press the bearing until it stops at the shoulder of the balancer shaft [C].
●Install the water pump shaft bearing and seal as shown.

[A] Oil Seal
[B] Marked Side
[C] Ball Bearing (without seal)
[D] Ball Bearing (both sides seal)
[E] Mechanical Seal (see Cooling System chapter)

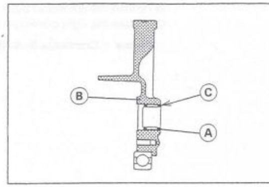


●Install the output shaft bearing [A] into the right crankcase [B] with the sealed side [C] facing the crankcase.



Left Crankcase:

● Install the needle bearing [A] into the left crankcase [B] with the marked side [C] facing inside, and level the bearing with the outboard end of the bearing housing.

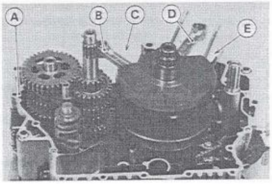


Crankshaft / Connecting Rods

Crankshaft Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the crankshaft.

Crankshaft Installation



- Insert the crankshaft tapered end in to the left crankcase [A].
- Install the left connecting rod [B] into the rear cylinder opening [C], and right connecting rod [D] into the front cylinder opening [E].

Connecting Rod Removal

- Remove the crankshaft (see Crankshaft Removal).

NOTE

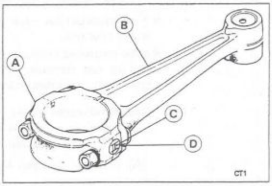
○ *Mark and record the locations of the connecting rods and their big end caps so that they can be reassembled in their original positions.*

- Remove the connecting rod big end cap nuts, and take off the rod and cap with the bearing inserts from the crankshaft.

Connecting Rod Installation

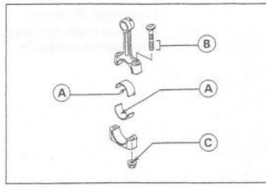
CAUTION

To minimize vibration, the connecting rods should have the same weight mark.



Big End Cap [A]
Connecting Rod [B]
Weight Mark, Alphabet [C]
Diameter Mark [D]

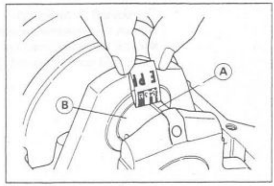
- If the connecting rods, bearing inserts, or crankshaft are replaced with new ones, select the bearing insert and check clearance with a plasti-gage (press gauge) before assembling engine to be sure the correct bearing inserts are installed.



● Apply engine oil to the inner surface of upper and lower bearing inserts [A].
● Apply a small amount of engine oil to the threads [B] and seating surface [C] of the connecting rod big end cap nuts.
● Tighten the cap nuts.

Torque – Connecting Rod Big End Cap Nuts: 46 N-m (4.7 kg-m, 34 ft-lb)

Connecting Rod Big End Bearing Insert/Crankpin Wear



● Measure the bearing insert/crankpin [A] clearance with a plastigage (press gauge) [B].

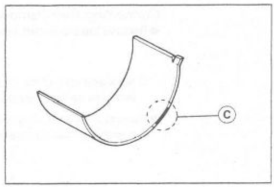
NOTE

○ *Tighten the connecting rod big end cap nuts to the specified torque (see Connecting Rod Installation).*
○ *Do not move the connecting rod and crankshaft during clearance measurement.*

Connecting Rod Big End Bearing Insert/Crankpin Clearance

Standard:	**0.026 ~ 0.054 mm**
Service Limit:	**0.09 mm**

★ If clearance is within the standard, no bearing replacement is required.
★ If clearance is between 0.054 mm and the service limit (0.09 mm), replace the bearing inserts with inserts painted blue [C]. Check insert/crankpin clearance with the plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.

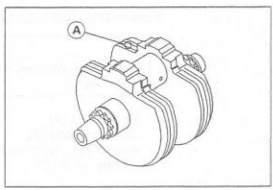


★ If the clearance exceeds the service limit, measure the diameter of the crankpins.

Crankpin Diameter

Standard:	**42.984 ~ 43.000 mm**
Service Limit:	**42.97 mm**

★ If any crankpin has worn past the service limit, replace the crankshaft with a new one.
★ If the measured crankpin diameters are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, make new marks on it.



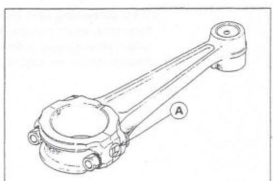
Crankpin Diameter Marks

None	**42.984 ~ 42.992 mm**
1	**42.993 ~ 43.000 mm**

[A]: Crankpin Diameter Marks, "1" mark or no mark.

● Measure the connecting rod big end bore diameter, and mark each connecting rod big end in accordance with the bore diameter.

Bore Diameter Mark (Around Weight Mark) [A]: "○" or no mark.



NOTE

○ *Tighten the connecting rod big end cap nuts to the specified torque (see Connecting Rod Installation).*
○ *The mark already on the big end should almost coincide with the measurement.*

Connecting Rod Big End Bore Diameter Marks
None 46.000 ~ 46.020 mm
○ 46.011 ~ 46.020 mm

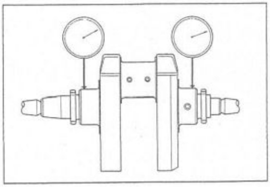
● Select the proper bearing insert in accordance with the combination of the connecting rod and crankshaft coding.
● Install the new inserts in the connecting rod and check insert/crankpin clearance with the plastigage.

Connecting Rod Big End Bearing Insert Selection

Con-rod Big End Bore Diameter Marking	Crankpin Diameter Marking	Bearing Insert	
		Size Color	Part Number
None	1	Brown	13034-1059
None	None	Black	13034-1058
○	1	Black	13034-1058
○	None	Blue	13034-1057

Crankshaft Runout

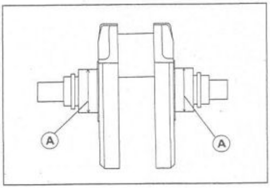
● Measure the crankshaft runout.
★ If the measurement exceeds the service limit, replace the crankshaft.



Crankshaft Runout
Standard: **TIR 0.02 mm or less**
Service Limit: **TIR 0.05 mm**

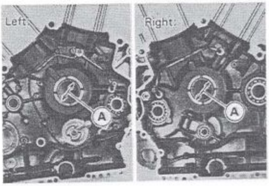
Crankshaft Main Bearing / Main Journal Wear

● Measure the diameter [A] of the crankshaft main journal.
★ If any journal has worn past the service limit, replace the crankshaft with a new one.



Crankshaft Main Journal Diameter
Standard: **42.984 ~ 43.000 mm**
Service Limit: **42.96 mm**

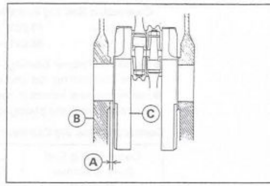
● Measure the main bearing bore diameter [A] in the crankcase halves.
★ If the diameter exceeds the service limit, replace the crankcase halves as a set.



Crankcase Main Bearing Bore Diameter
Standard: **43.025 ~ 43.014 mm**
Service Limit: **43.09 mm**

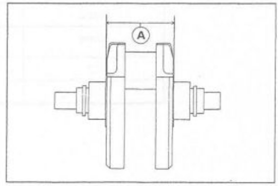
Crankshaft Side Clearance

- Measure the crankshaft side clearance [A].
- Insert a thickness gauge between the crankcase [B] main bearing and crank web [C].



Crankshaft Side Clearance
Standard: **0.05 ~ 0.55 mm**
Service Limit: **0.75 mm**

★If the clearance exceeds the service limit, measure the crankshaft web length [A] to see whether the crankshaft or the crankcase is faulty.

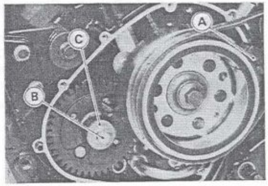


Crankshaft Web Length
Standard: **96.85 ~ 96.95 mm**
Service Limit: **96.6 mm**

★If the length measurement is smaller than the service limit, replace the crankshaft. Otherwise, replace the crankcase halves as a set.

Balancer, Starter Clutch

Left Balancer Removal



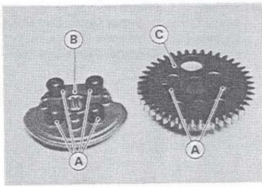
- Remove the alternator cover (see Electrical System chapter).
- Wipe oil off the outer circumference of the alternator rotor.
- Hold the alternator rotor steady with the flywheel holder [A], and remove the balancer bolt [B] and washer [C].

Special Tool – Flywheel Holder: 57001-1313

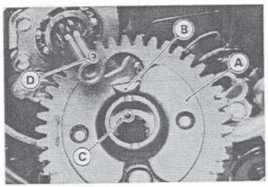
- Remove:
  Alternator Rotor (see Electrical System chapter)
  Collar, Balancer Gear, and Left Balancer

★If the balancer is hard to remove, use a suitable puller.

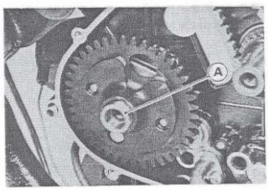
Left Balancer Installation



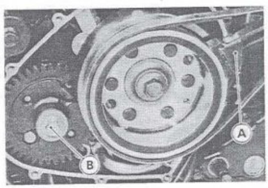
- Clean the balancer gear bolt and threads in the balancer shaft.
- Install the balancer dampers [A] on the balancer weight [B] and balancer gear [C] as shown.



- Assemble the gear [A] and balancer weight [B] being careful of the position as shown.
- Install the balancer assembly on the shaft, aligning the balancer weight punch mark [C] with the shaft punch mark [D].



- Install the collar [A].



- Install the alternator rotor (see Electrical System chapter).
- Hold the alternator rotor steady with the flywheel holder [A].

Special Tool – Flywheel Holder: 57001-1313

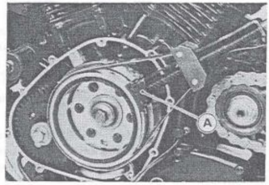
- Apply a non-permanent locking agent to the threads of the balancer gear bolt [B], and tighten it.

Torque – Balancer Gear Bolt: 69 N-m (7.0 kg-m, 51 ft-lb)

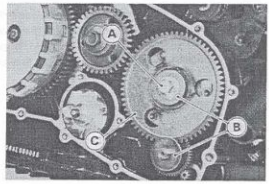
Right Balancer, Starter Clutch Removal

- Remove:
  Alternator Cover (see Electrical System chapter)
  Right Engine Cover (see Clutch chapter)
- Wipe oil off the outer circumference of the alternator rotor.
- Hold the rotor steady with the flywheel holder [A].

Special Tool – Flywheel Holder: 57001-1313

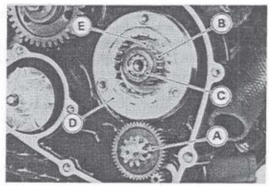


- Remove:
  Starter Clutch Gear Bolt [A]
  Washers [B]
  Starter Clutch Gear [C]

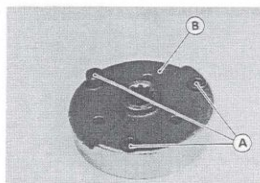


Torque Limiter [A]
Needle Bearing [B] and Collar [C]
Starter Clutch Assembly [D] and Copper Washer [E]

★If the assembly is hard to remove, use a suitable puller.



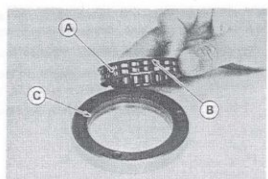
- Remove the starter clutch bolts [A], and separate the right balancer [B] from the starter clutch.



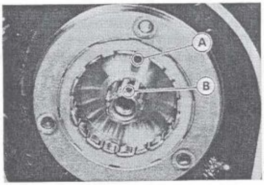
Right Balancer, Starter Clutch Installation

- Be sure to install the one-way clutch [A] so that the flange [B] of it fits in the coupling recess [C].
- Apply a non-permanent locking agent to the threads of the starter clutch bolts, and tighten them.

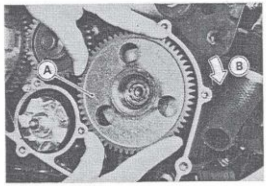
Torque – Starter Clutch Bolts: 34 N-m (3.5 kg-m, 25 ft-lb)



●Clean the starter clutch gear bolt and threads in the balancer shaft.
●Install the starter clutch assembly on the shaft, aligning the balancer weight punch mark [A] with the shaft punch mark [B].

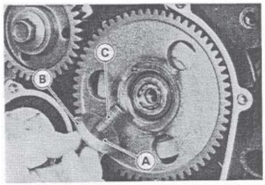


●Install:
  Copper Washer
  Collar and Needle Bearing
  Torque Limiter
●Install the starter clutch gear [A] while turning [B] the gear.

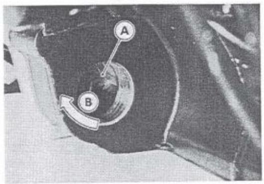


●Install the washer [A] so that the chamfered side [B] faces inward.
●Apply a non-permanent locking agent to the threads of the starter clutch gear bolt [C], and tighten it.

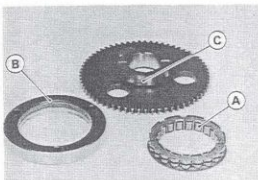
Torque – Starter Clutch Gear Bolt: 69 N-m (7.0 kg-m, 51 ft-lb)



Starter Clutch Inspection
●Drain the engine oil (see Engine Lubrication System chapter).
●Remove the starter motor (see Electrical System chapter).
●Turn the torque limiter gear [A] by hand. When viewed from the left side of the engine, the gear should turn clockwise freely [B], but should not turn counterclockwise.
★If the gear does not operate as it should or if it makes noise, go to the next step.



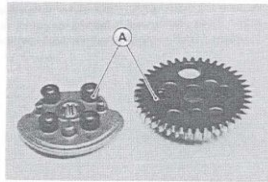
●Disassemble the starter clutch (see Right Balancer, Starter Clutch Removal).
●Visually inspect:
  One-way Clutch [A]
  Coupling [B]
  Starter Clutch Gear Inner Race [C]
★If there is any worn or damaged part, replace it.



Balancer Damper Inspection

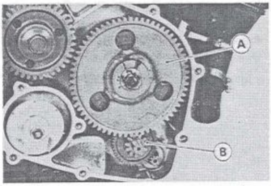
- Remove the left balancer (see Left Balancer Removal).
- Visually inspect the rubber dampers [A].

★If they appear damaged or deteriorated, replace them.



Torque Limiter

Torque Limiter Removal



- Remove
  Right Engine Cover (see Clutch chapter)
  Starter Clutch Gear [A] (see Right Balancer, Starter Clutch Removal)
  Torque Limiter [B]

CAUTION
Do not disassemble the torque limiter. The torque limiter will not function if this is done.

Torque Limiter Inspection

- Remove the torque limiter and visually inspect it.

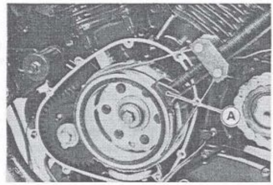
★If the limiter has wear, discoloration, or other damage, replace it as a set.

Primary Gear

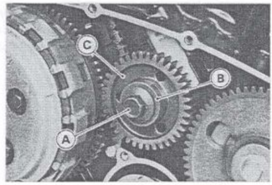
Primary Gear Removal

- Remove the alternator cover (see Electrical System chapter).
- Wipe oil off the outer circumference of the alternator rotor.
- Hold the alternator rotor steady with the flywheel holder [A].

Special Tool – Flywheel Holder: 57001-1313



- Remove the primary gear bolt [A], washer [B], and primary gear [C] from the crankshaft.



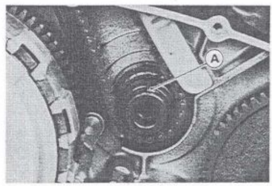
Primary Gear Installation

- Fit the woodruff key [A] securely in the slot in the crankshaft before installing the primary gear.
- Hold the alternator rotor steady with the flywheel holder.

Special Tool – Flywheel Holder: 57001-1313

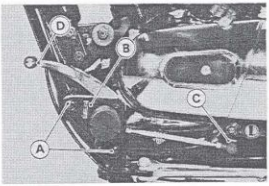
- Apply oil to the threads and seating surface of the primary gear bolt, and tighten it.

Torque – Primary Gear Bolt: 157 N·m (16.0 kg·m, 115 ft·lb)



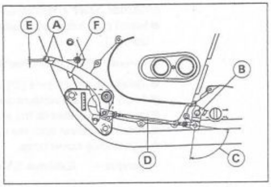
Transmission

Shift Pedal Removal



- Mark the position of the shift lever on the shift shaft so that it can be installed later in the same position.
- Remove:
  Bolts [A]
  Footpeg Bracket [B], Shift Lever [C], and Shift Pedal [D]

Shift Pedal Installation



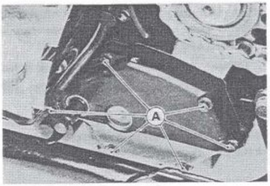
- Install the shift pedal [A] so that the shift lever [B] positions at right angles [C] with the shift rod [D].
- At this time, the center of the shift pedal is about 4 mm [E] higher than the center of the engine bracket lower mounting bolt [F].

NOTE

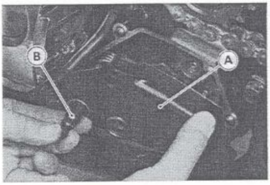
○ *The locknut next to the knurled portion of the rod has left-hand threads.*

★If necessary, adjust the pedal position from the standard position to suit you as follows.
- Loosen the front and rear rod locknuts.
- Turn the rod to adjust the pedal position.
- Tighten the locknuts securely.

External Shift Mechanism Removal

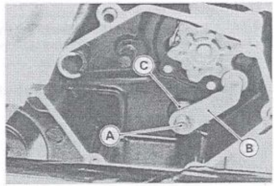


- Remove:
  Engine Oil (drain, see Engine Lubrication System chapter)
  Shift Pedal (see Shift Pedal Removal)
  Engine Sprocket Cover (see Final Drive chapter)
  External Shift Mechanism Cover Bolts [A]



- Remove the external shift mechanism cover [A] with the shift shaft [B] from the crankcase.

- Remove:
  Bolt [A]
  Shift Drum Position Lever [B]
  Spring [C]



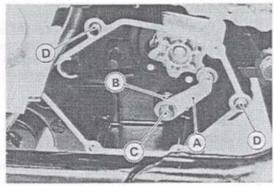
External Shift Mechanism Installation

- Install the shift drum position lever [A] and spring [B], and tighten the bolt [C].

Torque – Shift Drum Position Lever Bolt: 11 N-m (1.1 kg-m, 95 in-lb)

- Install the knock pins [D] and new cover gasket.
- Apply high temperature grease to the oil seal lips.
- Install the washer to the shift shaft, then insert the shaft into the cover.
- Install the cover with the shaft to the crankcase.
- Tighten the cover bolts.

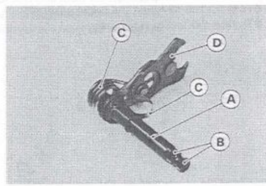
Torque – External Shift Mechanism Cover Bolts: 11 N·m (1.1 kg·m, 95 in·lb)



External Shift Mechanism Inspection

- Examine the shift shaft [A] for any damage.

★If the shaft is bent, straighten or replace it.
★If the splines [B] are damaged, replace the shaft.
★If the springs [C] are damaged in any way, replace them.
★If the shift mechanism arm [D] is damaged in any way, replace it.



- Check the return spring pin [A] is not loose.

★If it is loose, unscrew it, apply a non-permanent locking agent to the threads, and tighten it.

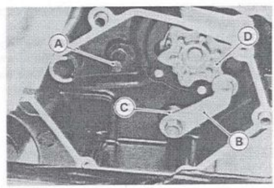
Torque – Shift Shaft Return spring Pin: 29 N-m (3.0 kg-m, 22 ft-lb)

- Check the shift drum position lever [B] and spring [C] for breaks or distortion.

★If the lever or spring is damaged in any way, replace it.

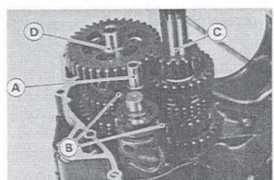
- Visually inspect the shift drum cam [D].

★If it is badly worn or shows any damage, replace it.



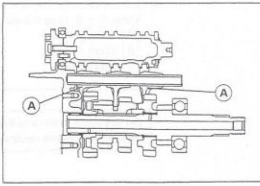
Transmission Shaft, Shift Fork Removal

- Split the crankcase (see Crankcase Splitting).
- Remove:
  Shift Rod [A]
  Shift Forks (2) [B]
- Take out the drive shaft [C] and output shaft [D] as a set, and remove the remainder shift fork.

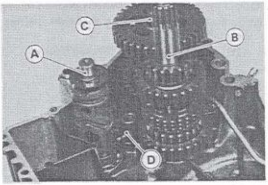


Transmission Shaft, Shift Fork Installation

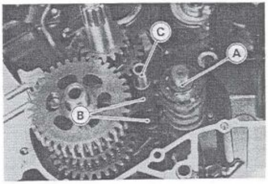
- Make the direction of the shift forks as shown.
  - The two forks [A] on the output shaft are identical.



- Position the shift drum [A] as shown.
- Apply engine oil to the transmission shafts and shift fork.
- Install the drive shaft [B], output shaft [C], and shift fork [D] on the output shaft as a set.



- Set the shift drum [A] in the neutral position as shown.
- Apply engine oil to the shift forks [B] and shift rod [C], and install them.

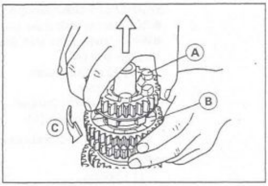


Transmission Disassembly

- Remove the transmission shafts (see Transmission Shaft Removal).
- Remove the circlips, disassemble the transmission shafts.

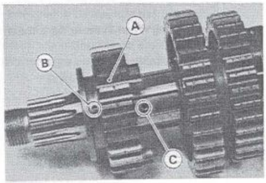
Special Tool – Outside Circlip Pliers: 57001-144

- The 4th gear [A] on the output shaft has three steel balls assembled into it for the positive neutral finder mechanism. Remove the 4th gear.
  - Set the output shaft in a vertical position holding the 3rd gear [B].
  - Spin the 4th gear quickly [C] and pull it off upward.

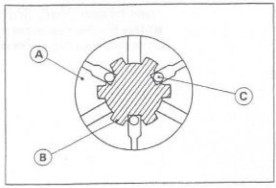


Transmission Assembly

- Install the 5th gear [A] on the output shaft with its oil hole [B] aligned with the shaft oil hole [C].



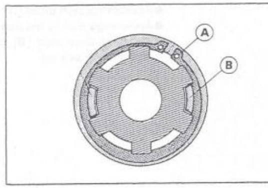
- Fit the steel balls into the 4th gear holes as shown.
  View A – A' (see the output shaft illustration)
  [A] Gear (4th)
  [B] Shaft
  [C] Steel Balls



CAUTION

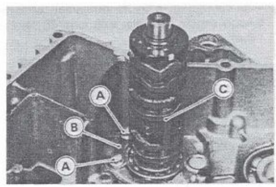
Do not apply grease to the steel balls to hold them in place. This will cause the positive neutral finder mechanism to malfunction.

- Replace any circlip that were removed with new ones.
- Install the circlips [A] so that the opening is aligned with a spline groove.
  [B] Toothed Washer



Shift Drum Removal

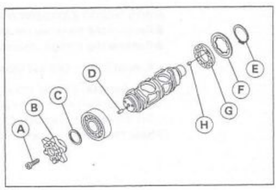
- Remove:
  Transmission Shafts (see Transmission Shaft Removal)
  Bolts [A]
  Bearing Stopper [B]
- While aligning the shift drum cam with the left crankcase hole, pull out the shift drum [C].



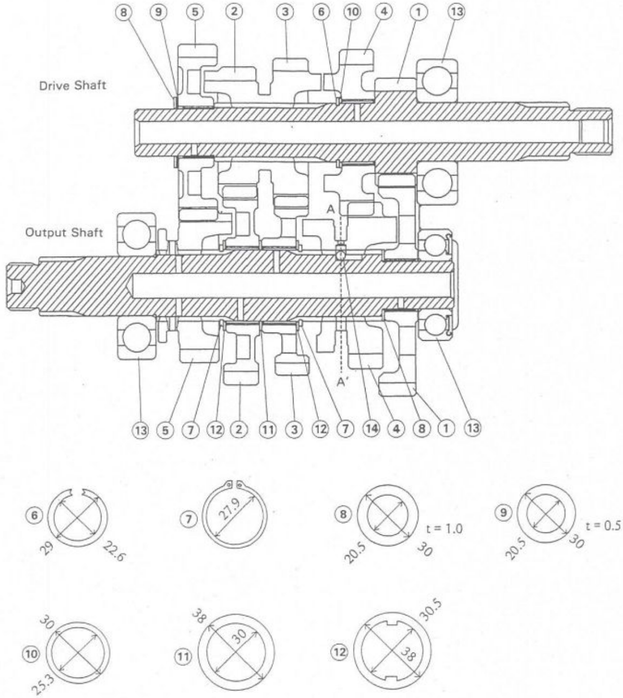
Shift Drum Disassembly/Assembly

- Remove the shift drum (see Shift Drum Removal).
- While holding the shift drum with a vise, remove the shift drum cam holder bolt [A].
  [B] Shift Drum Cam
  [C] Washer
  [D] Knock Pin (longer)
- Remove the circlip [E].

Special Tool – Outside Circlip Pliers: 57001-144



- Remove:
  [F] Spring
  [G] Shift Drum Holder
  [H] Knock Pin (shorter)
- When assembling the shift drum, note the following.
  - Be sure to install the knock pins.
  - Apply a non-permanent locking agent to the threads of the shift drum cam mounting bolt.

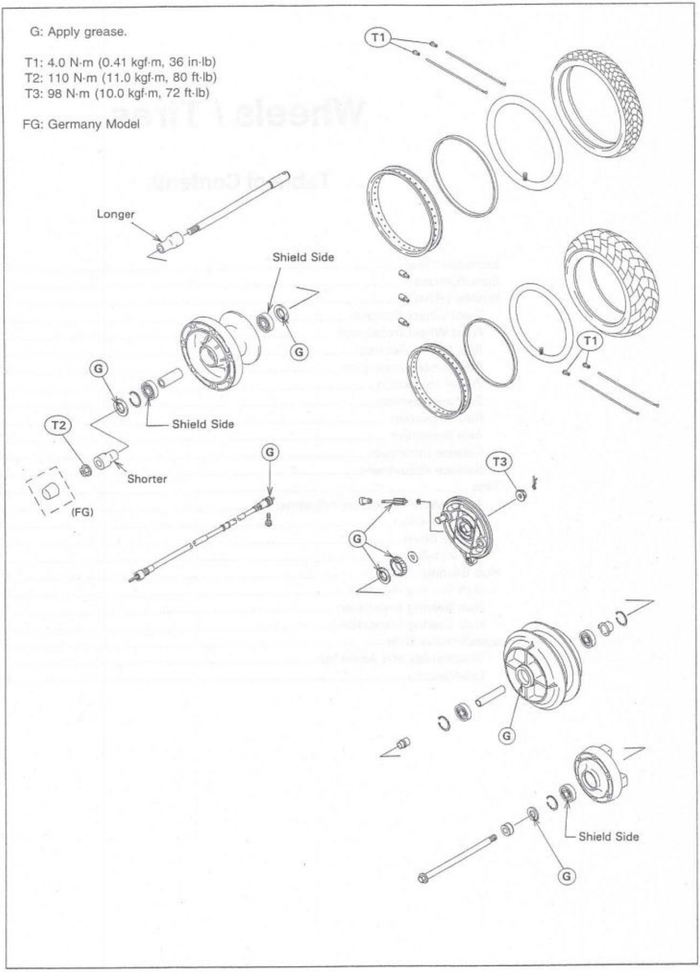


1. 1st Gear
2. 2nd Gear
3. 3rd Gear
4. 4th Gear
5. 5th (Top) Gear
6. Circlip
7. Circlip
8. Thrust Washer (20.5 × 30 × 1.0)
9. Thrust Washer (20.5 × 30 × 0.5)
10. Thrust Washer (25.3 × 30 × 1.0)
11. Thrust Washer (30 × 38 × 1.0)
12. Toothed Washer
13. Ball Bearing
14. Steel Ball

Wheels / Tires

Table of Contents

Exploded View



Specifications

Item		Standard	Service Limit
Wheel (Rims):			
Rim runout:	Radial	1.0 mm	2.0 mm
	Axial	0.8 mm	2.0 mm
Axle runout/100 mm		less than 0.05 mm	0.2 mm
Wheel balance		less than 10g	– – –
Balance weights		10g, 20g, 30g	– – –
Tires:			
Air pressure (when cold):			
Front:	Up to 97.5 kg (215 lb) load	200 kPa (2.00 kg/cm^2, 28 psi)	– – –
	Over 97.5 kg (215 lb) load	225 kPa (2.25 kg/cm^2, 32 psi)	– – –
Rear:	Up to 97.5 kg (215 lb) load	200 kPa (2.00 kg/cm^2, 28 psi)	– – –
	Over 97.5 kg (215 lb) load	225 kPa (2.25 kg/cm^2, 32 psi)	– – –
Tread depth:			
	Front	4.3 mm	1 mm
	Rear	7.7 mm	Up to 130 km/h (80 mph) : 2 mm Over 130 km/h (80 mph) : 3 mm

Standard tires:	Make, Type	Size
Front	BRIDGESTONE, EXEDRA L307 (tube) DUNLOP, D404F (tube) METZERLER, MARATHON FRONT PIPELLI MT69E	80/90-21 48H
Rear	BRIDGESTONE, EXEDRA G544 (tube) DUNLOP, D404 (tube) PIPELLI MT68E (tube)	140/90-16 71H
	METZELER, REINFORCED ML2 PLUS (tube)	140/90-B16 71H

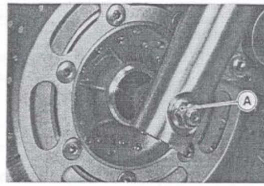
Special Tool -
Inside Circlip Pliers: 57001–143
Rim Protector: 57001–1063
Bead Breaker Assembly: 57001–1072
Bearing Driver Set: 57001–1129
Jack: 57001–1238
Bearing Remover Shaft: 57001–1265
Bearing Remover Head, $\phi 15 \times \phi 17$: 57001–1267

Wheels (Rims)

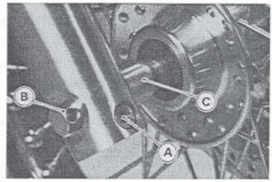
Front Wheel Removal

- Loosen the front axle nut [A].
- Raise the front wheel off the ground.

Special Tool – Jack: 57001-1238



- Loosen the axle clamp bolt [A].
- Pull out the axle [B] to the right, and remove the front wheel and collars [C].



CAUTION

Do not lay the wheel down on one of the disc. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

Front Wheel Installation

- Fit the longer collar on the right side and shorter collar on the left side of the hub.
- Tighten the axle nut and axle clamp bolt.

Torque – Front Axle Nut: 110 N-m (11.0 kg-m, 80 ft-lb)
Front Axle Clamp Bolt: 34 N-m (3.5 kg-m, 25 ft-lb)

- Check the front brake.

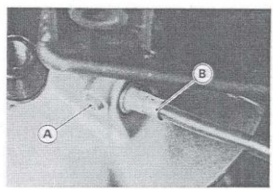
⚠WARNING

Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brake will not function on the first application of the lever if this is not done.

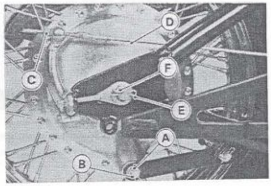
Rear Wheel Removal

- Remove:
  Muffler (see Engine Top End chapter)
  Bolt [A] and Speedometer Cable [B]
- Raise the rear wheel off the ground.

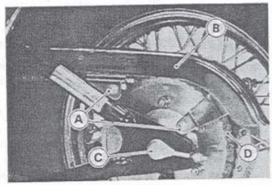
Special Tool – Jack: 57001-1238



●Remove:
Clip [A], Torque Link Nut [B] and Bolt
Adjusting Nut [C] and Brake Rod [D]
Clip [E] and Axle Nut [F]

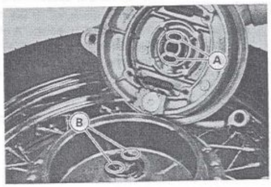


Bolts [A] and Chain Cover [B]
Axle [C]
●Remove the drive chain [D] from the rear sprocket toward the left.
●Remove the rear wheel.



Rear Wheel Installation

●Install the speedometer gear in the brake panel so that its projections [A] fit into the gear drive notches [B] in the wheel hub.
●Engage the drive chain with the rear sprocket.
●Insert the axle from the left side of the wheel.
●To prevent a soft, or "spongy feeling" brake, center the brake panel assembly in the brake drum as follows:
○Tighten the axle nut lightly.
○Install the torque link bolt and nut.
○Spin the wheel, and apply the rear brake, and then tighten the axle nut to the specified torque.



Torque – Rear Axle Nut: 98 N-m (10.0 kg-m, 72 ft-lb)

●Adjust the drive chain slack (see Final Drive chapter).
●Install the removed parts.

Torque – Torque Link Nuts: 34 N-m (3.5 kg-m, 25 ft-lb)

●Check the rear brake.

Wheel Inspection

●Raise the front/rear wheel off the ground.
Special Tool – Jack: 57001-1238

●Spin the wheel lightly, and check for roughness or binding.
★If roughness or binding is found, replace the hub bearings.
●Visually inspect the front and rear axles for damage.
★If the axle is damaged or bent, replace it.

Spoke Inspection

● Check that all the spokes are tightened evenly.

★ If spoke tightness is uneven or loose, tighten the spoke nipples evenly.

Torque - Spoke Nipples: 4.0 N·m (0.41 kgf·m, 36 in·lb)

● Check the rim runout.

⚠WARNING

If any spoke breaks, it should be replaced immediately. A missing spoke places and additional load on the other spokes, which will eventually cause other spokes to break.

Rim Inspection

● Raise the front/rear wheel off the ground.

Special Tool – Jack: 57001-1238

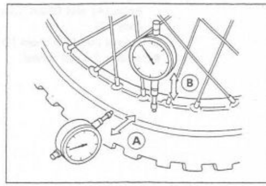
● Inspect the rim for small cracks, dents, bending, or warping.

★ If there is any damage to the rim, it must be replaced.

● Set a dial gauge against the side of the rim, and rotate the rim to measure the axial runout [A]. The difference between the highest and lowest dial readings is the amount of runout.

● Set a dial gauge against the outer circumference of the rim, and rotate the rim to measure radial runout [B]. The difference between the highest and lowest dial readings is the amount of runout.

★ If rim runout exceeds the service limit, check the hub bearings first. Replace them if they are damaged. If the problem is not due to the bearings, correct the rim warp (runout). A certain amount of rim warp can be corrected by recentering the rim. Loosen some spokes and tighten others within the standard torque to change the position of different parts of the rim. If the rim is badly bent, however, it must be replaced.



Rim Runout (with tire installed)

Standard:	**Radial**	**1.0 mm**
	Axial	**0.8 mm**
Service Limit:	**Radial**	**2.0 mm**
	Axial	**2.0 mm**

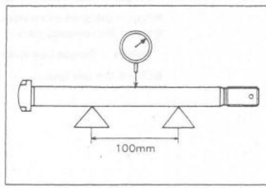
Axle Inspection

● Visually inspect the front and rear axle for damages.

★ If the axle is damaged or bent, replace it.

● Measure the axle runout with a dial gauge.

★ If axle runout exceeds the service limit, replace the axle.



Axle Runout/100 mm

Standard:	**less than 0.05 mm**
Service Limit:	**0.2 mm**

Balance Inspection

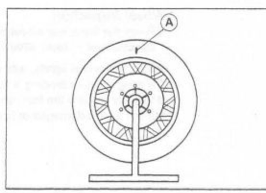
● Remove the wheel.

● Support the wheel so that it can be spun freely.

● Spin the wheel lightly, and mark [A] the wheel at the top when the wheel stops.

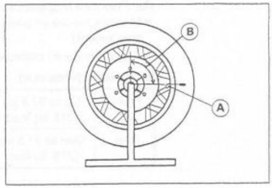
○ Repeat this procedure several times. If the wheel stops of its own accord in various positions, it is well balanced.

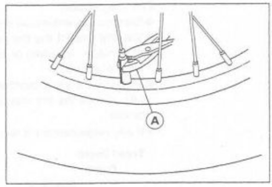
★ If the wheel always stops in one position, adjust the wheel balance.



Balance Adjustment

- If the wheel always stops in one position, provisionally attach a balance weight [A] on the wheel.
- ○ Attach a balance weight loosely to the spoke under the marking.
- Rotate the wheel ¼ turn [B], and see whether or not the wheel stops in this position. If it does, the correct balance weight is being used.
- ★If the wheel rotates and the weight goes up, replace the weight with the next heavier size.
- ★If the wheel rotates and the weight goes down, replace the weight with the next lighter size.
- Repeat these steps until the wheel remains at rest after being rotated ¼ turn.
- Rotate the wheel another ¼ turn and then another ¼ turn to see if the wheel is correctly balanced.
- Repeat the entire procedure as many times as necessary to achieve correct wheel balance.
- Permanently install the balance weight.
- Install the balance weight firmly on the wheel.
- ○ Clamp on the balance weight firmly using pliers [A].



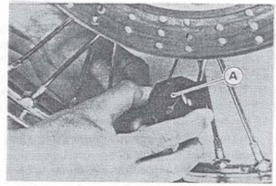


Balance Weight

Part Number	Weight(grams)
41075-1017	10
41075-1008	20
41075-1009	30

Tires

Air Pressure Inspection/Adjustment



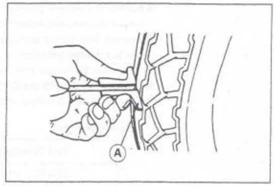
- Measure the tire air pressure with an air pressure gauge [A] when the tires are cold.

★Adjust the tire air pressure according to the specifications if necessary.

Air Pressure (when cold)

Front and Rear	Up to 97.5 kg (215 lb) load	200 kPa (2.00 kg/cm², 28 psi)
	Over to 97.5 kg (215 lb) load	225 kPa (2.25 kg/cm², 32 psi)

Tire Inspection



- Remove any imbedded stones or other foreign particles from the tread.
- Visually inspect the tire for cracks and cuts, replacing the tire in case of damage. Swelling or high spots indicate internal damage, requiring tire replacement.
- Measure the tread depth at the center of the tread with a depth gauge [A]. Since the tire may wear unevenly, take measurement at several places.

★If any measurement is less than the service limit, replace the tire.

Tread Depth

Front:

Standard:	**4.3 mm**
Service Limit:	**1 mm**

Rear:

Standard:	**7.7 mm**
Service Limit:	**2 mm (Up to 130 km/h)** **3 mm (Over 130 km/h)**

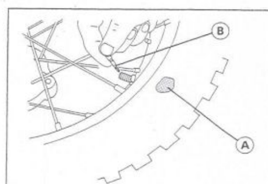
⚠WARNING

To ensure safe handling and stability, use only the recommended standard tires for replacement, inflated to the standard pressure.

NOTE

○ *Check and balance the wheel when a tire is replaced with a new one.*

Tire Removal



CAUTION

Do not lay the front wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

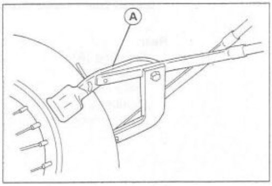
- Remove the wheel.
- To maintain wheel balance, mark [A] the valve stem position on the tire with chalk so that the tire can be reinstalled in the same position.
- Take out the valve core [B] to let out the air.

○When handling the rim, be careful not to damage the rim flanges.
●Lubricate the tire beads and rim flanges on both sides with a soap and water solution or rubber lubricant. This helps the tire beads slip off the rim flanges.

CAUTION
Never lubricate with engine oil or petroleum distillates because they will deteriorate the tire.

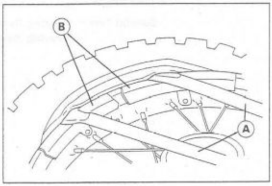
●Break the beads away from both sides of the rim with the bead breaker [A].

Special Tool – Bead Breaker Assembly: 57001-1072



●Pry the tire off the rim with the tire iron [A] of the bead breaker protecting the rim with rim protectors [B].

Special Tool – Rim Protector: 57001-1063
Bead Breaker Assembly: 57001-1072

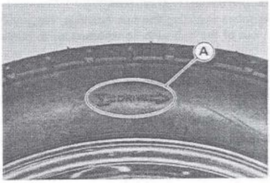


Tire Installation

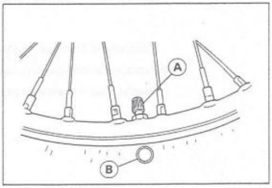
●Check the tire rotation mark [A] on the front/rear tire and install it on the rim accordingly.

NOTE

○*The direction of the tire rotation is shown by an arrow on the tire sidewall.*

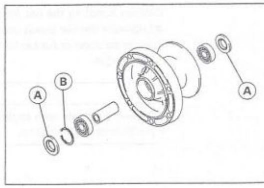


●Position the tire on the rim so that the valve [A] is at the tire balance mark [B] (the chalk mark made during removal or the yellow paint mark on a new tire).
●Check and adjust the air pressure after installing.



Hub Bearing

Hub Bearing Removal



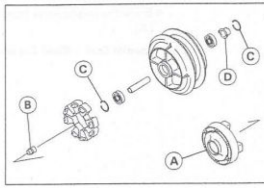
- Remove the wheel, and take out the following.

CAUTION
Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

Front:

Grease Seals [A]
Circlip [B]

Special Tool – Inside Circlip Pliers: 57001-143

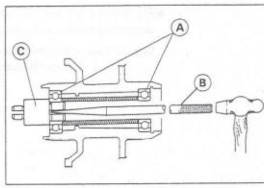


Rear:

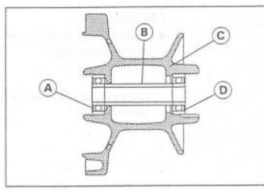
Coupling [A]
Collar [B]
Brake Panel
Circlips [C]
Speedometer Gear Drive [D]

- Take the bearings [A] out of the hub, using the bearing remover.

Special Tool – Bearing Remover Shaft: 57001-1265 [B]
Bearing Remover Head, Φ15 × Φ17: 57001-1267 [C]



Hub Bearing Installation



- Before installing the hub bearings, blow any dirt or foreign particles out of the hub with compressed air to prevent contamination of the bearings.
- Replace the bearings with new ones.
- Install the front bearings the following sequence.

○ Press in the left side bearing [A] until it is bottomed.

Special Tool – Bearing Driver Set: 57001-1129

○ Insert the collar [B] in the hub [C].
○ Press in the right side bearing [D] until it is bottomed.

- Press in the rear bearings until they are bottomed.

Special Tool – Bearing Driver Set: 57001-1129

NOTE

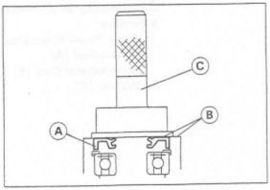
○ *Install the bearings so that the marked side or sealed side faces out.*

- Replace the circlips with new ones.

Special Tool – Inside Circlip Pliers: 57001-143

- Replace the grease seals with new ones.
- Press in the grease seal [A] so that the seal surface is flush [B] with the end of the hole.
- ○ Apply high temperature grease to the grease seal lips.

Special Tool – Bearing Driver Set: 57001-1129 [C]



Hub Bearing Inspection

NOTE

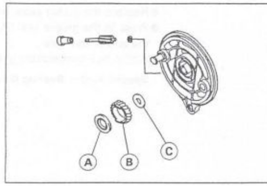
○ It is not necessary to remove any bearings for inspection. If any bearings are removed, they will need to be replaced with new ones.

- Spin it by hand to check its condition.
- ★ If it is noisy, does not spin smoothly, or has any rough spots, it must be replaced.
- Examine the bearing seal for tears or leakage.
- ★ If the seal is torn or is leaking, replace the bearing.

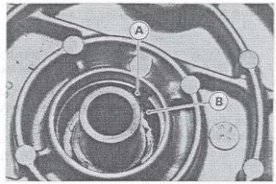
Speedometer Gear

Disassembly and Assembly

- Remove;
  - Brake Panel, Brake Shoe
  - Grease Seal [A]
  - Speedometer Gear [B]
  - Washer [C]



- Tap the pinion washer [A], and remove the bushing, pinion [B], and washer.



NOTE

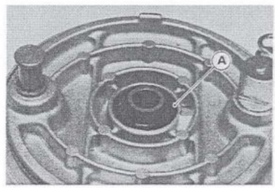
○ *It is recommended that the assembly be replaced rather than attempting to repair the components.*

- Press in the grease seal [A] until it is bottomed.

○ Apply high temperature grease to the grease seal lips.

Special Tool − Bearing Driver Set: 57001-1129

- Install the speedometer gear so that it fits in the speedometer gear drive notches (see Rear Wheel Installation).



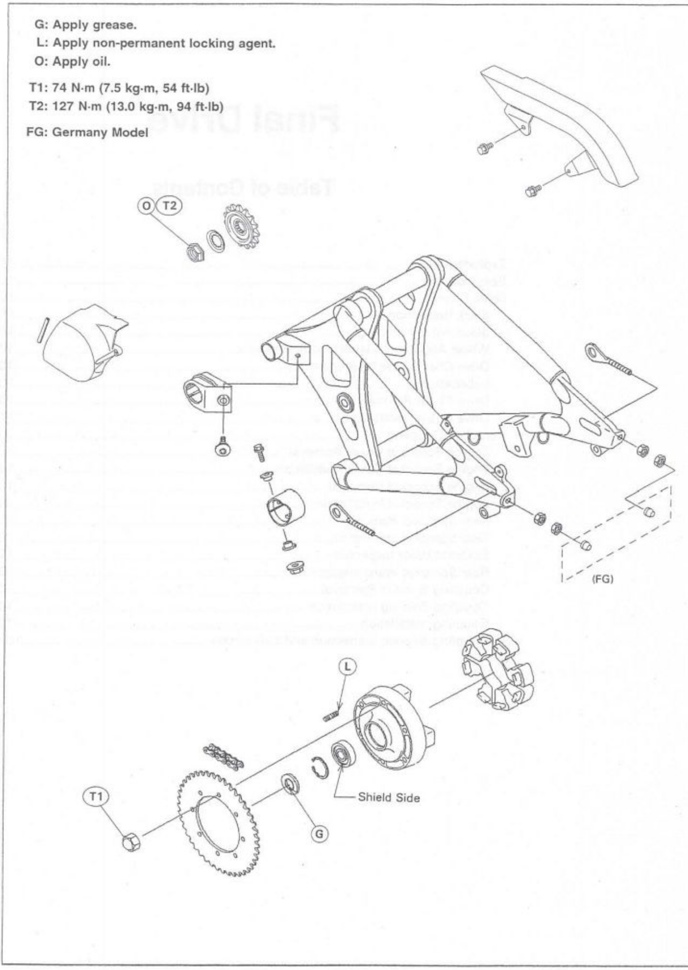
Lubrication

- Clean and grease the pinion, speedometer gear, and gear drive.

Final Drive

Table of Contents

Exploded View



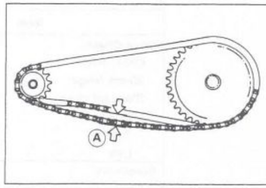
Specifications

Item	Standard	Service Limit
Drive Chain:		
Chain slack	25 ~ 35 mm	– – –
20-link length	317.5 ~ 318.2 mm	323 mm
Standard chain		
Make	Enuma	– – –
Type	EK50MV-O, Endless	– – –
Link	114 links	– – –
Sprockets:		
Engine sprocket diameter	71.01 ~ 71.21 mm	70.3 mm
Rear sprocket diameter	222.52 ~ 223.02 mm	222.2 mm
Rear sprocket warp	Less than 0.4 mm	0.5 mm

Special Tool - **Inside Circlip Pliers: 57001–143**
Bearing Driver Set: 57001–1129

Drive Chain

Slack Inspection



NOTE

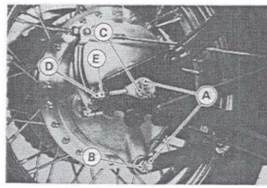
○ *Check the slack with the motorcycle setting on its side stand.*
○ *Clean the chain if it is dirty, and lubricate it if it appears dry.*

- Check the wheel alignment (see Wheel Alignment Inspection).
- Rotate the rear wheel to find the position where the chain is tightest.
- Measure the vertical movement (chain slack) [A] midway between the sprockets.

★If the chain slack exceeds the standard, adjust it.

Chain Slack
Standard: 25 ~ 35 mm

Slack Adjustment



- Remove:
  Muffler (see Engine Top End chapter)
  Clips [A]
- Loosen:
  Rear Torque Link Nut [B]
  Axle Nut [C]
  Chain Adjuster Locknuts [D] (both sides)
- Turn the chain adjusting nuts [E] forward or rearward until the drive chain has the correct amount of chain slack.
- The right and left notches on the alignment indicators should point to the same marks or positions on the swingarm.

⚠WARNING

Misalignment of the wheel will result in abnormal wear and may result in an unsafe riding condition.

- Tighten both chain adjuster locknuts securely.
- Tighten the axle nut (see Rear Wheel Installation section in Wheels/Tires chapter).

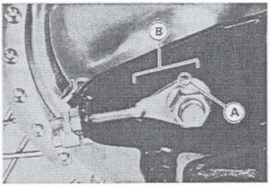
Torque – Rear Axle Nut: 98 N-m (10.0 kg-m, 72 ft-lb)

- Turn the wheel, measure the chain slack again at the tightest position, and readjust if necessary.
- Tighten the torque link nut.

Torque – Torque Link Nuts: 34 N-m (3.5 kg-m, 25 ft-lb)

- Install the clips to the rear axle and torque link bolt.
- Check the rear brake.

Wheel Alignment Inspection/Adjustment



● Check that the left and right notches [A] on the chain adjuster should point to the same marks or points [B] on the left and right swingarm.

★ If they do not, adjust the chain slack and align the wheel alignment (see Slack Adjustment).

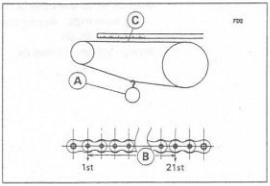
NOTE

○ *Wheel alignment can be also be checked using the straightedge or string method.*

⚠WARNING

Misalignment of the wheel will result in abnormal wear, and may result in an unsafe riding condition.

Drive Chain Wear Inspection



● Remove:
  Chain Cover

● Rotate the rear wheel to inspect the drive chain for damaged rollers, and loose pins and links.

★ If there is any irregularity, replace the drive chain.

★ Lubricate the drive chain if it appears dry.

● Stretch the chain taut by hanging a 98 N (10 kg, 20 lb) weight [A] on the chain.

● Measure the length of 20 links [B] on the straight part [C] of the chain from the pin center of the 1st pin to the pin center of the 21st pin. Since the chain may wear unevenly, take measurements at several places.

★ If any measurements exceed the service limit, replace the chain. Also, replace the front and rear sprockets when the drive chain is replaced.

Drive Chain 20-link Length

Standard:	**317.5 ~ 318.2 mm**
Service Limit:	**323 mm**

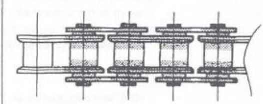
⚠WARNING

If the drive chain wear exceeds the service limit, replace the chain or an unsafe riding condition may result. A chain that breaks or jumps off the sprockets could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing it to go out of control.

For safely, use only the standard chain. It is an endless type and should not be cut for installation.

Lubrication

- If a special lubricant is not available, a heavy oil such as SAE 90 is preferred to a lighter oil because it will stay on the chain longer and provide better lubrication.
- If the chain appears especially dirty, clean it before lubrication.



▨ : Apply oil.

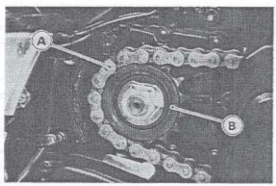
CAUTION

The O-rings between the side plates seal in the lubricant between the pin and the bushing. To avoid damaging the O-rings and resultant loss of lubricant, observe the following rules.
Use only kerosene or diesel oil for cleaning an O-ring drive chain.
Any other cleaning solution such as gasoline or trichloroethylene will cause deterioration and swelling of the O-ring.
Immediately blow the chain dry with compressed air after cleaning.
Complete cleaning and drying the chain within 10 minutes.

- Apply oil to the sides of the rollers so that oil will penetrate to the rollers and bushings. Apply the oil to the O-rings so that the O-rings will be coated with oil.
- Wipe off any excess oil.

Drive Chain Removal

- Remove:
  Rear Wheel (see Wheels/Tires chapter)
  Swingarm (see Suspension chapter)
  Engine Sprocket Cover (see Engine Sprocket Cover Removal)
- Disengage the drive chain [A] from the engine sprocket [B], and take it off the chassis.

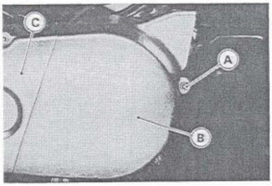


Drive Chain Installation

- Engage the drive chain with the engine sprocket.
- Install:
  Swingarm (see Suspension chapter)
  Rear Wheel (see Wheels/Tires chapter)
  Engine Sprocket Cover (see Engine Sprocket Cover Installation)
- Adjust the chain slack after installing the chain (see Slack Adjustment).

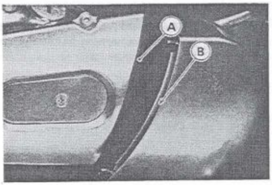
Sprocket, Coupling

Engine Sprocket Cover Removal



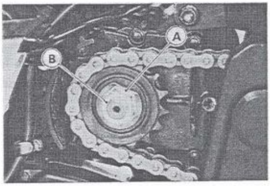
- Remove the bolt [A].
- Pull the engine sprocket cover [B] to the rear until the cover separates from the alternator cover [C], and remove it.

Engine Sprocket Cover Installation



- Install the trim [A] on the alternator cover end.
- Fit the groove [B] of the engine sprocket cover to the trim.

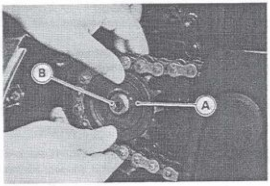
Engine Sprocket Removal



- Remove:
  Engine Sprocket Cover (see Engine Sprocket Cover Removal)
  Chain Cover
- Flatten out the bended washer [A].
- Remove the engine sprocket nut [B] and washer.

NOTE

○ *When loosening the engine sprocket nut, hold the rear brake on.*



- Loosen the drive chain (see Slack Adjustment).
- Remove the drive chain from the rear sprocket toward the right.
- Pull the engine sprocket [A] off the output shaft [B] along with the chain.
- Remove the engine sprocket.

Engine Sprocket Installation

- Replace the sprocket washer.
- Install the engine sprocket onto the output shaft.
- Apply oil to the threads of the output shaft and the seating surface of the engine sprocket nut.
- Engage the drive chain with the engine and rear sprocket.
- After torquing the engine sprocket nut, bend the one side of the washer over the nut.

NOTE

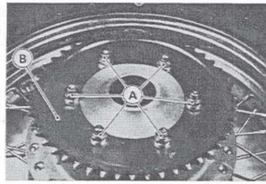
○ *Tighten the nut while applying the rear brake.*

Torque - Engine Sprocket Nut: 127 N·m (13.0 kg·m, 94 ft·lb)

● Adjust the drive chain slack after installing the sprocket (see Slack Adjustment).

Rear Sprocket Removal

● Remove the rear wheel (see Wheel/Tires chapter).
● Remove the rear sprocket nuts [A].
● Remove the rear sprocket [B].

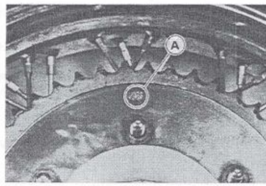


Rear Sprocket Installation

● Install the sprocket facing the tooth number marking [A] outward.
● Tighten the rear sprocket nuts.

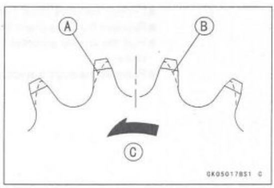
Torque – Rear Sprocket Nuts : 74 N-m (7.5 kg-m, 54 ft-lb)

● Install the rear wheel (see Wheels/ Tires chapter).



Sprocket Wear Inspection

● Visually inspect the engine and rear sprocket teeth for wear and damage.
★ If the teeth are worn as illustrated, replace the sprocket, and inspect the drive chain wear (see Drive Chain Wear Inspection).
[A] Worn Tooth (Engine Sprocket)
[B] Worn Tooth (Rear Sprocket)
[C] Direction of Rotation

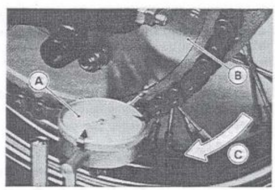


NOTE

○ *If a sprocket requires replacement, the chain is probably worn also. When replacing a sprocket, inspect the chain.*

Rear Sprocket Warp Inspectiòn

● Raise the rear wheel off the ground (see Wheels/Tires chapter) so that it will turn freely.
● Set a dial gauge [A] against the rear sprocket [B] near the teeth as shown, and rotate [C] the rear wheel to measure the sprocket runout (warp). The difference between the highest and lowest dial gauge readings is the amount of runout (warp).
★ If the runout exceeds the service limit, replace the rear sprocket.



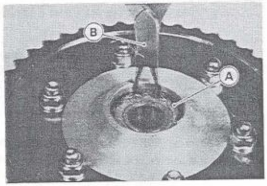
Rear Sprocket Warp

Standard:	**less than 0.4 mm**
Service Limit:	**0.5 mm**

Coupling Bearing Removal

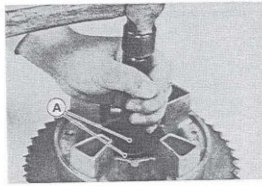
● Remove:
  Coupling
  Grease Seal
  Circlip [A]

Special Tool – Inside Circlip Pliers: 57001-143 [B]



● Remove the bearing by tapping from the wheel side.

Special Tool – Bearing Driver Set: 57001-1129 [A]



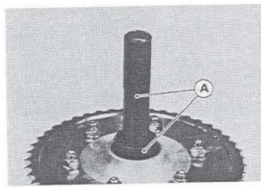
Coupling Bearing Installation

● Replace the bearing with a new one.
● Press in the bearing until it is bottomed.

Special Tool – Bearing Driver Set: 57001-1129 [A]

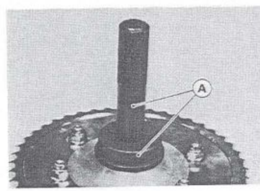
● Pack the bearing with high temperature grease.
● Replace the circlip with a new one.

Special Tool – Inside Circlip Pliers: 57001-143



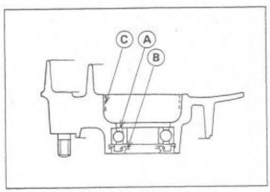
● Replace the grease seal with a new one.
● Press in the grease seal so that the seal surface is flush with the end of the hole.
○ Apply high temperature grease to the grease seal lips.

Special Tool – Bearing Driver Set: 57001-1129 [A]



Coupling Installation

● Grease the following and install the coupling.
  Ball Bearing [A]
  Coupling Grease Seal [B]
  Coupling Internal Surface [C]



Coupling Bearing Inspection and Lubrication

NOTE

○ *It is not necessary to remove the coupling bearing for inspection and lubrication. If the bearing is removed, it will need to be replaced with a new one.*

★If it is noisy, does not spin smoothly, or has any rough spots, it must be replaced.

●Examine the bearing seal for tears or leakage.

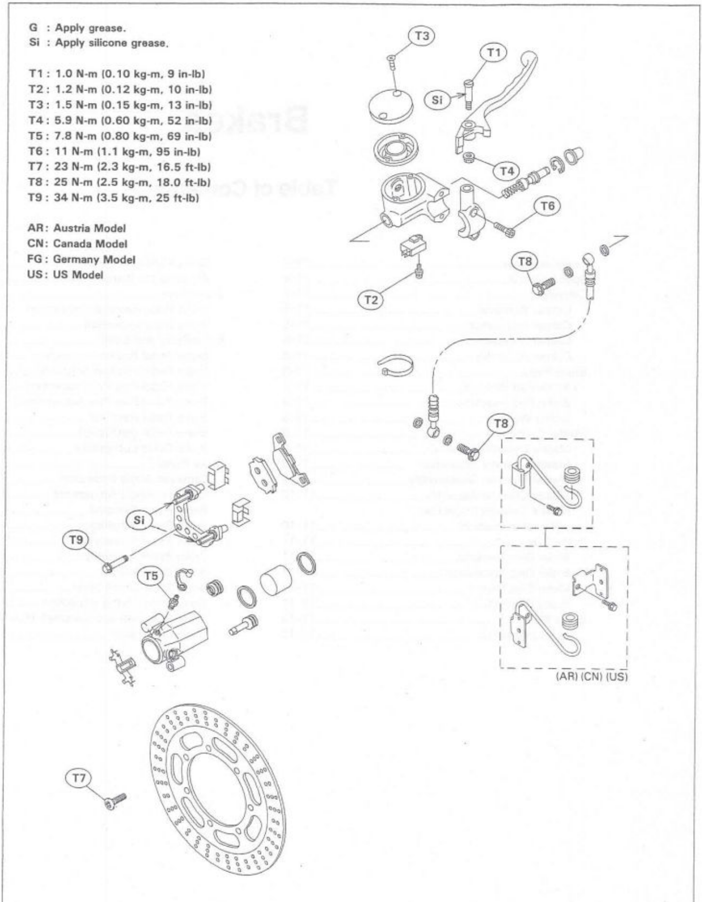
★If the seal is torn or is leaking, replace the bearing.

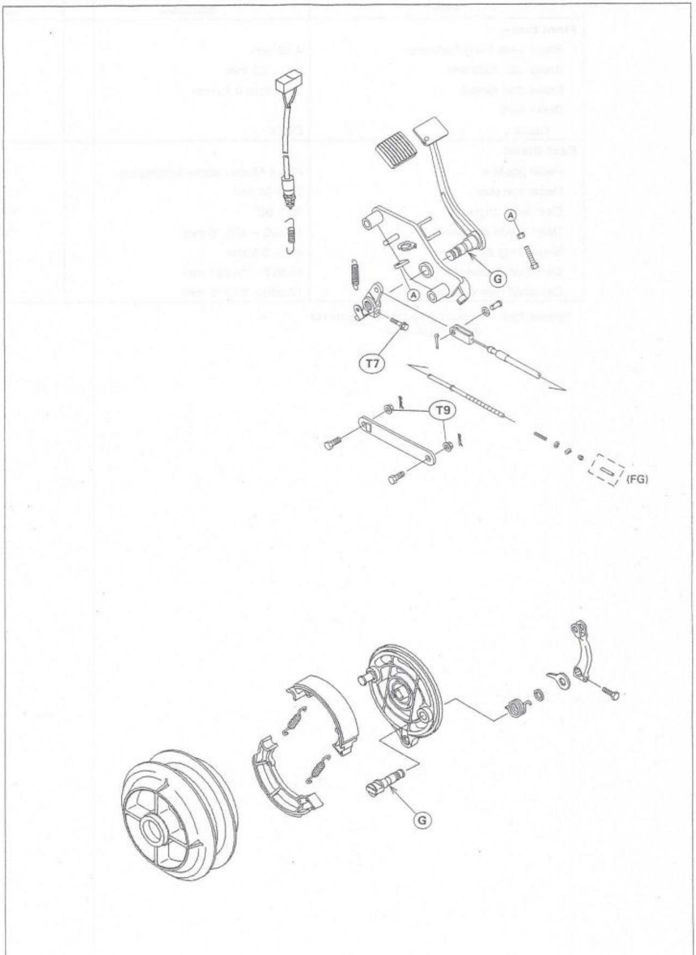
●Pack the bearing with good quality bearing grease. Turn the bearing around by hand a few times to make sure the grease is distributed uniformly inside the bearing.

Brakes

Table of Contents

Exploded View




A
A
G
T7
T9
(FG)
G

Specifications

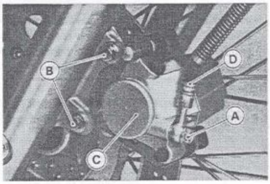
Item	Standard	Service Limit
Front Brake:		
Brake pads lining thickness	4.85 mm	1 mm
Brake disc thickness	4.8 ~ 5.2 mm	4.5 mm
Brake disc runout	Less than 0.15 mm	0.3 mm
Brake fluid:		
Grade	DOT4	– – –
Rear Brake:		
Pedal position	About 65 mm above footpeg top	– – –
Pedal free play	20 ~ 30 mm	– – –
Cam lever angle	80 ~ 90°	– – –
Drum inside diameter	180.00 ~ 180.16 mm	180.75 mm
Shoe lining thickness	4.9 ~ 5.5 mm	2.6 mm
Camshaft diameter	16.957 ~ 16.984 mm	16.88 mm
Camshaft hole diameter	17.000 ~ 17.070 mm	17.15 mm

Special Tool - Inside Circlip Pliers: 57001–143
Jack: 57001–1238

Calipers

Caliper Removal

- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Unscrew the caliper mounting bolts [B], and detach the caliper [C] from the disc.
- Unscrew the banjo bolt and remove the brake hose [D] from the caliper (see Brake Hose Removal/Installation).



CAUTION
Immediately wash away any brake fluid that spills.

NOTE

○ *If the caliper is to be disassembled after removal and if compressed air is not available, disassemble the caliper before the brake hose is removed (see Caliper Disassembly).*

Caliper Installation

- Install the caliper and brake hose lower end.
○ Replace the washers that are on each side of hose fitting with new ones.
- Tighten the caliper mounting bolts and banjo bolt.

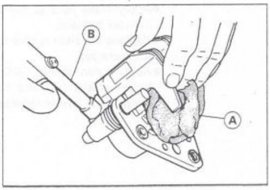
Torque – Caliper Mounting Bolts: 34 N-m (3.5 kg-m, 25 ft-lb)
Brake Hose Banjo Bolt: 25 N-m (2.5 kg-m, 18.0 ft-lb)

- Check the fluid level in the brake reservoir.
- Bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠WARNING
Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brakes will not function on the first application of the lever if this is not done.

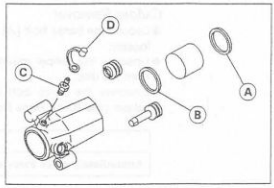
Caliper Disassembly

- Remove the caliper.
- Remove the pads and anti-rattle spring (see Brake Pad Removal).
- Remove the piston insulator.
- Using compressed air, remove the piston.
○ Cover the caliper opening with a clean, heavy cloth [A].
○ Remove the piston by lightly applying compressed air [B] to where the brake line fits into the caliper.



⚠WARNING

To avoid serious injury, never place your fingers or palm inside the caliper opening. If you apply compressed air into the caliper, the piston may crush your hand or fingers.



- Remove the dust seal [A] and fluid seal [B].
- Remove the bleed valve [C] and rubber cap [D].

NOTE

○*If compressed air is not available, do as follows with the brake hose connected to the caliper.*
○*Prepare a container for brake fluid, and perform the work above it.*
○*Remove the pads and spring (see Brake Pad Removal).*
○*Pump the brake lever to remove the caliper piston.*

Caliper Assembly

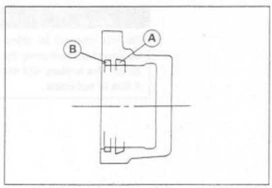
- Clean the caliper parts except for the pads.

CAUTION

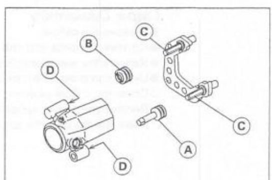
For cleaning the parts, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol.

- Install the bleed valve and rubber cap.

Torque – Bleed Valve: 7.8 N-m (0.80 kg-m, 69 in-lb)

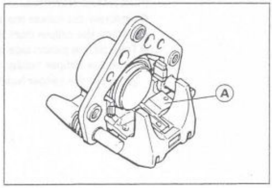


- Replace the fluid seal [A] with a new one.
○Apply brake fluid to the fluid seal, and install it into the cylinder by hand.
- Replace the dust seal [B] with a new one if it is damaged.
○Apply brake fluid to the dust seal, and install it into the cylinder by hand.



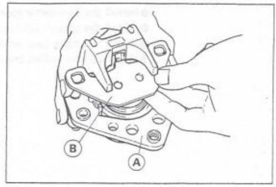
- Apply brake fluid to the outside of the piston, and push it into the cylinder by hand.
- Replace the shaft rubber friction boot [A] and dust cover [B] if they are damaged.
- Apply a thin coat of PBC (Poly Butyl Cuprysil) grease to the caliper holder shafts [C] and holder holes [D] (PBC is a special high temperature, water-resistance grease).

- Install the anti-rattle spring [A] in the caliper as shown.
- Install the piston insulator.
- Install the pads (see Brake Pad Installation).
- Wipe up any spilled brake fluid on the caliper with wet cloth.



Brake Pads

Brake Pad Removal



- Unscrew the caliper mounting bolts.
- Detach the caliper from the disc.
- Take off the piston side pad from the caliper holder [A].
- Push the caliper holder to the piston side, and then remove the pad [B] from the caliper holder shaft.

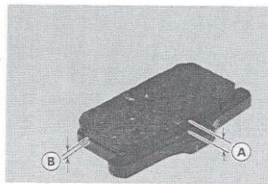
Brake Pad Installation

- Push the caliper piston in by hand as far as it will go.
- Install the anti-rattle spring in place.
- Install the brake pads.
- Install the caliper (see Caliper Installation).

⚠WARNING

Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brake will not function on the first application of the lever if this is not done.

Lining Wear



- Check the lining thickness [A] of the pads in the caliper.

★If the lining thickness of either pad is less than the service limit [B], replace both pads in the caliper as a set.

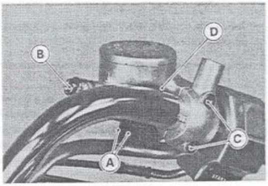
Pad Lining Thickness

Standard:	4.85 mm
Service Limit:	1 mm

Master Cylinder

Master Cylinder Removal

- Disconnect the front brake light switch connectors [A].
- Remove the banjo bolt [B] to disconnect the brake hose from the master cylinder (see Brake Hose Removal/Installation).
- Unscrew the clamp bolts [C], and take off the master cylinder [D] as an assembly with the reservoir, brake lever, and brake switch installed.



Master Cylinder Installation

- Apply grease to the extreme end of the clamp bolts.
- Tighten the upper clamp bolt first, and then the lower clamp bolt. There will be a gap at the lower part of the clamp after tightening.

Torque – Master Cylinder Clamp Bolts: 11 N-m (1.1 kg-m, 95 in-lb)

- Replace the washers that are on each side of the hose fitting with new ones.
- Tighten the brake hose banjo bolt.

Torque – Brake Hose Banjo Bolt: 25 N-m (2.5 kg-m, 18.0 ft-lb)

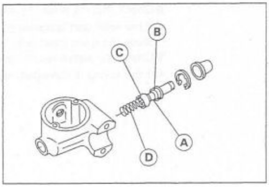
- Bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

Master Cylinder Disassembly

- Remove the master cylinder (see Master Cylinder Removal).
- Remove the reservoir cap and diaphragm, and pour the brake fluid into a container.
- Unscrew the pivot nut and pivot bolt, and remove the brake lever.
- Push the dust cover out of place, and remove the circlip.

Special Tool – Inside Circlip Pliers: 57001-143

- Pull out the piston [A], secondary cup [B], primary cup [C], and return spring [D].



CAUTION

Do not remove the secondary cup from the piston since removal will damage it.

Master Cylinder Assembly

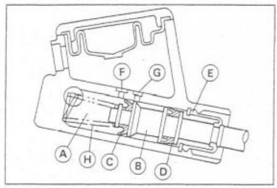
- Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.

CAUTION
Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts, Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely, and will eventually deteriorate the rubber used in the disc brake.

- Apply brake fluid to the removed parts and to the inner wall of the cylinder.
- Take care not to scratch the piston or the inner wall of the cylinder.
- Tighten the brake lever pivot bolt and pivot nut.

Torque – Brake Lever Pivot Bolt: 1.0 N-m (0.10 kg-m, 9 in-lb)
Brake Lever Pivot Nut: 5.9 N-m (0.60 kg-m, 52 in-lb)

Master Cylinder Inspection (Visual Inspection)



- Disassemble the master cylinder (see Master Cylinder Disassembly).
- Check that there are no scratches, rust or pitting on the inner wall of the master cylinder [A] and on the outside of the piston [B].

★If the master cylinder or piston shows any damage, replace them.

- Inspect the primary [C] and secondary [D] cups.

★If a cup is worn, damaged softened (rotted), or swollen, the piston assembly should be replaced to renew the cups.

★If fluid leakage is noted at the brake lever, the piston assembly should be replaced to renew the cups.

- Check the dust cover [E] for damage.

★If it is damaged, replace it.

- Check that the relief [F] and supply [G] ports are not plugged.

★If the relief port becomes plugged, the brake pads will drag on the disc. Blow the ports clean with compressed air.

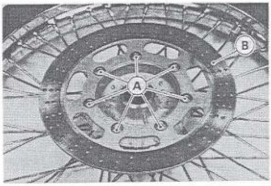
- Check the piston return spring [H] for any damage.

★If the spring is damaged, replace it.

Brake Disc

Brake Disc Removal

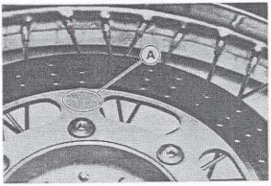
● Remove the wheel (see Wheels/Tires chapter).
● Unscrew the mounting bolts [A], and take off the disc [B].



Brake Disc Installation

● Install the brake disc on the wheel so that the marked side [A] faces out.
● Tighten the mounting bolts.

Torque − Brake Disc Mounting Bolts: 23 N-m (2.3 kg-m, 16.5 ft-lb)

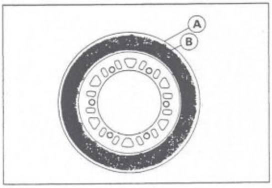


Brake Disc Wear

● Measure the thickness of the disc at the point where it has worn the most.
★ Replace the disc [A] if it has worn past the service limit.
[B] Measuring Area

Disc Thickness

Standard:	**4.8 ~ 5.2 mm**
Service Limit:	**4.5 mm**



Brake Disc Warp

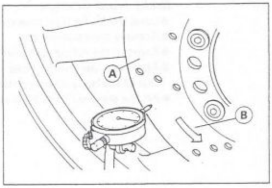
● Jack up the motorcycle so that the wheel is off the ground.

Special Tool − Jack: 57001-1238

● Turn the handlebar fully to one side.
● Set up a dial gauge against the disc [A] as shown and measure disc runout.
[B] Turn the wheel by hand.
★ If runout exceeds the service limit, replace the disc.

Disc Runout

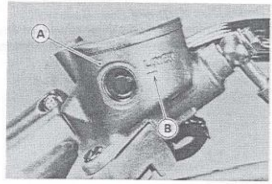
Standard:	**Less than 0.15 mm**
Service Limit:	**0.3 mm**



Brake Fluid

Level Inspection

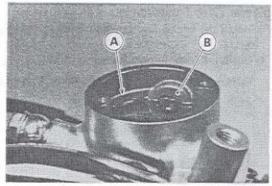
●Check that the brake fluid level in the front brake reservoir [A] is above the lower level line [B].



NOTE

○*Hold the reservoir horizontal by turning the handlebar when checking brake fluid level.*

★If the fluid level is lower than the lower level line, fill the reservoir to the upper level line [A] in the reservoir [B].



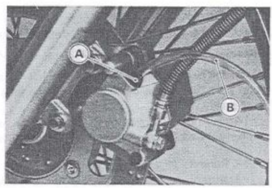
⚠WARNING

Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that is already in the reservoir are unidentified. After changing the fluid, use only the same type and brand of fluid thereafter.

Recommended Disc Brake Fluid
Grade: DOT4

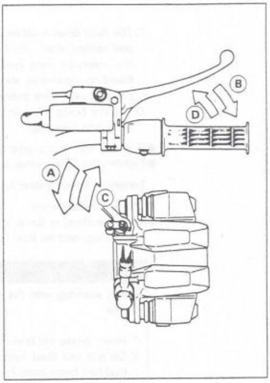
Brake Fluid Change

●Level the brake fluid reservoir.
●Remove the reservoir cap.
●Remove the rubber cap from the bleed valve [A] on the caliper.
●Attach a clear plastic hose [B] to the bleed valve, and run the other end of the hose into a container.
●Fill the reservoir with fresh specified brake fluid.



● Change the brake fluid as follows:
○ Repeat this operation until fresh brake fluid comes out from the plastic hose or the color of the fluid changes.

1. Open the bleed valve [A].
2. Apply the brake and hold it [B].
3. Close the bleed valve [C].
4. Release the brake [D].



NOTE

○ *The fluid level must be checked often during the changing operation and replenished with fresh brake fluid. If the fluid in the reservoir runs out any time during the changing operation, the brakes will need to be bled since air will have entered the brake line.*

● Remove the clear plastic hose.
● Install the reservoir cap.
● Tighten the bleed valve, and install the rubber cap.

Torque − Bleed Valve: 7.8 N-m (0.80 kg-m, 69 in-lb)

● After changing the fluid, check the brake for good braking power, no brake drag, and no fluid leakage.
★ If necessary, bleed the air from the lines.

Bleeding the Brake Line

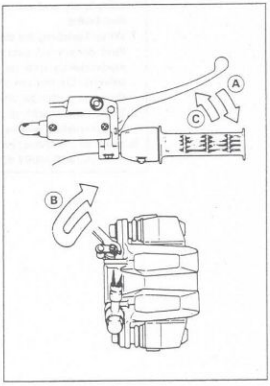
The brake fluid has a very low compression coefficient so that almost all the movement of the brake lever is transmitted directly to the caliper for braking action. Air, however, is easily compressed. When air enters the brake lines, brake lever movement will be partially used in compressing the air. This will make the lever feel spongy, and it will be a loss in braking power.

⚠WARNING

Be sure to bleed the air from the brake line whenever brake lever action feels soft or spongy after the brake fluid is changed, or whenever a brake line fitting has been loosened for any reason.

● Remove the reservoir cap, and fill the reservoir with fresh brake fluid to the upper level line in the reservoir.
● With the reservoir cap off, slowly pump the brake lever several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir.
○ Bleed the air completely from the master cylinder by this operation.
● Install the reservoir cap.
● Remove the rubber cap from the bleed valve on the caliper.
● Attach a clear plastic hose to the bleed valve, and run the other end of the hose into a container.
● Bleed the brake line and the caliper as follows:
○ Repeat this operation until no more air can be seen coming out into the plastic hose.

1. Pump the brake lever until it becomes hard, and apply the brake and hold it [A].
2. Quickly open and close[B] the bleed valve while holding the brake applied.
3. Release the brake [C].



NOTE

- *The fluid level must be checked often during the bleeding operation and replenished with fresh brake fluid as necessary. If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.*
- *Tap the brake hose lightly from the caliper to the reservoir for more complete bleeding.*

- Remove the clear plastic hose.
- Tighten the bleed valve, and install the rubber cap.

Torque − Bleed Valve: 7.8 N-m (0.80 kg-m, 69 in-lb)

- Check the fluid level.
- After bleeding is done, check the brake for good braking power, no brake drag, and no fluid leakage.

⚠WARNING

When working with the disc brake, observe the precautions listed below.

1. Never reuse old brake fluid.
2. Do not use fluid from a container that has been left unsealed or that has been open for a long time.
3. Do not mix two types and brands of fluid for use in the brake. This lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also cause the rubber brake parts to deteriorate.
4. Don't leave the reservoir cap off for any length of time to avoid moisture contamination of the fluid.
5. Don't change the fluid in the rain or when a strong wind is blowing.
6. Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely and will eventually deteriorate the rubber used in the disc brake.
7. When handling the disc pads or disc, be careful that no disc brake fluid or any oil gets on them. Clean off any fluid or oil that inadvertently gets on the pads or disc with a high-flash point solvent. Do not use one which will leave an oily residue. Replace the pads with new ones if they cannot be cleaned satisfactorily.
8. Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely washed away immediately.
9. If any of the brake line fittings or the bleed valve is opened at any time, the **AIR MUST BE BLED FROM THE BRAKE LINE.**

Brake Hose

Brake Hose Removal/Installation

CAUTION
Brake fluid quickly ruins painted or plastic surfaces; any spilled fluid should be completely wiped up immediately with wet cloth.

- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- When removing the brake hose, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.
- There are washers on each side of the brake hose fitting. Replace them with new ones when installing.
- When installing the hoses, avoid sharp bending, kinking, flattening or twisting, and route the hoses according to Hose Routing section in General Information chapter.
- Tighten the banjo bolts at the hose fittings.

  Torque − Brake Hose Banjo Bolts: 25 N-m (2.5 kg-m, 18.0 ft-lb)

- Bleed the brake line after installing the brake hose (see Bleeding the Brake Line).

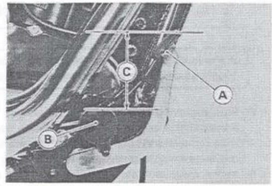
Brake Hose Inspection

- The high pressure inside the brake line can cause fluid to leak or the hose to burst if the line is not properly maintained. Bend and twist the rubber hose while examining it.

★Replace it if any cracks or bulges are noticed.

Brake Pedal and Cable

Brake Pedal Position Inspection

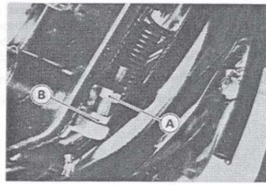


- Check that the brake pedal [A] is in the correct position.
  [B] Footpeg

Pedal Position [C]
Standard: **About 65 mm above footpeg top**

★If it is incorrect, adjust the brake pedal position.

Brake Pedal Position Adjustment

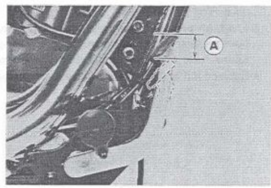


- Loosen the locknut [A], and turn the adjusting bolt [B] until the brake pedal is correctly positioned.
- Tighten the locknut.
- Check:
  Rear Brake Light Switch (see Electrical System chapter)
  Brake Pedal Free Play (see Brake Pedal Free Play Inspection)

NOTE

○*If the pedal position cannot be adjusted by turning the adjusting bolt, the brake pedal may be deformed or incorrectly installed.*

Brake Pedal Free Play Inspection



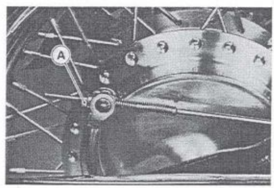
- Check the brake pedal free play [A].

○Depress the rear brake pedal lightly by hand until the brake is applied.

★If the free play is incorrect, adjust it.

Pedal Free Play
Standard: **20 ~ 30 mm**

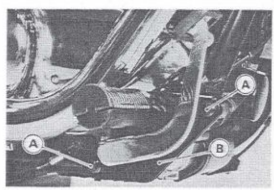
Brake Pedal Free Play Adjustment



- Turn the adjusting nut [A] at the rear brake until the brake pedal has the correct amount of play.
- Operate the pedal a few times to see that it returns to its rest position immediately upon release.
- Rotate the rear wheels to check for brake drag.
- Check braking effectiveness.

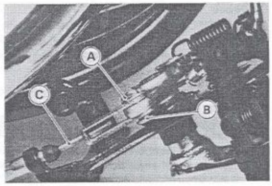
★If there is any doubt as to the conditions of the brake, check the brake parts for wear or damage.

Brake Pedal Removal

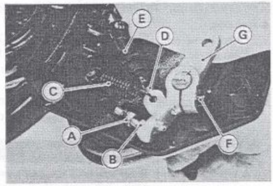


- Remove:
  Bolts [A] and Footpeg Bracket [B]

Cotter Pin [A], Joint Pin [B], and Brake Cable [C]

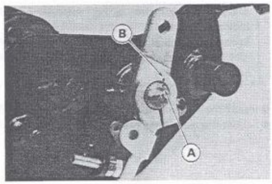


- Loosen the locknut [A] and adjusting bolt [B].
- Remove:
  Brake Pedal Spring [C]
  Brake Switch Spring [D]
  Brake Switch [E]
  Bolt [F] and Brake Pedal Lever [G]
  Brake Pedal



Brake Pedal Installation

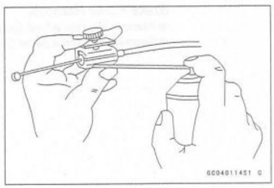
- Align the punch mark [A] on the brake pedal shaft with the punch mark [B] on the pedal lever.



Brake Cable Lubrication

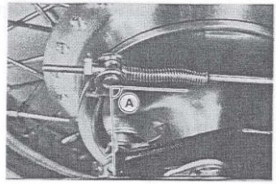
Whenever the brake cable is removed, lubricate the cable as follows:

- Lubricate the cable with a penetrating rust inhibitor.



Brake Panel

Camlever Angle Inspection



- Check that the rear brake cam lever comes to an **80° ~ 90°** angle [A] with the rear brake rod when the rear brake is fully applied.

★If it does not, adjust the rear brake cam lever angle.

Cam Lever Angle
Standard: **80° ~ 90°**

> **⚠WARNING**
>
> **Since a cam lever angle greater than 90° reduces braking effectiveness, cam lever angle adjustment should not be neglected.**

Camlever Angle Adjustment

- Remove:
  - Rear Wheel (see Wheels/Tires chapter)
  - Cam Lever Bolt and Cam Lever

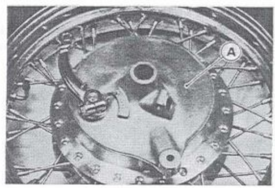
○Before removing the brake cam lever, mark the position of the cam lever.

- Mount the cam lever at a new position so that the cam lever moves one screw thread from the original position to the rear.

> **⚠WARNING**
>
> **A change in cam lever angle is caused by wear of internal brake parts. Whenever the cam lever angle is adjusted, also check for drag and proper operation, taking particular note of the brake lining wear indicator position.**
>
> **In case of doubt as to braking effectiveness, disassemble and inspect all internal brake parts. Worn parts could cause the brake to lock or fail.**

- Install the rear wheel (see Wheels/Tires chapter).
- Adjust the rear brake play (see Brake Pedal Free Play Inspection).

Brake Panel Removal



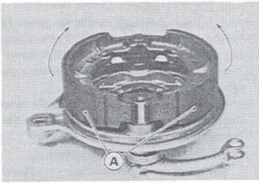
- Remove the rear wheel (see Wheels/Tires chapter).
- Separate the brake panel [A] from the wheel.

Brake Panel Installation

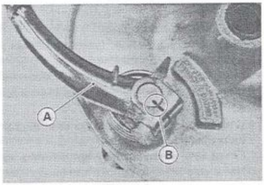
- Fit the brake panel to the rear wheel, and then install the rear wheel (see Wheels/Tires chapter).

Brake Panel Disassembly

- Remove the brake panel (see Brake Panel Removal).
- Using a clean cloth around the linings to prevent grease or oil from getting on them, remove the brake shoes [A] by pulling up on the center of the linings.

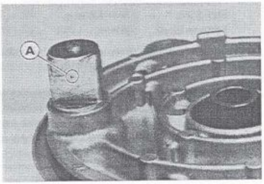


- Before removing the brake cam lever [A], mark [B] the position of the cam lever so that it can be installed later in the same position.



Brake Panel Assembly

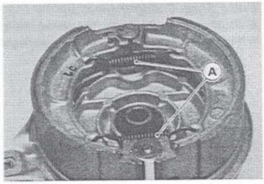
- Clean the old grease from the camshaft and regrease it.
- ○ Apply grease to the center of shaft and very lightly on the cam surfaces. Do not overgrease.
- Push the camshaft into the panel so that the triangular mark [A] on the cam surface points toward the center of the panel.



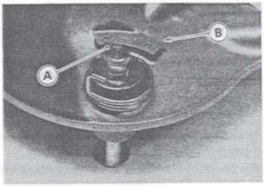
⚠WARNING

Improper installation will cause ineffective braking.

- Fit the springs [A] onto the brake shoes as shown.
- ○ The brake shoe springs are identical.
- Wrap a clean cloth around the linings to prevent grease or oil from getting on them, and install the shoes on the brake panel.

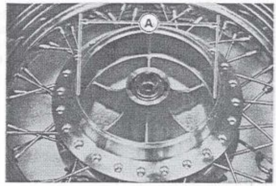


- Install the O-ring and fit the indicator [A] on the serration so that it points to the extreme left of the USABLE RANGE [B].
- Install the cam lever in its original position on the camshaft, and tighten its bolt.



Brake Drum Wear

- Remove the rear wheel (see Wheels/Tires chapter).
- Measure the inside diameter [A] of the drum.
- ○ Use calipers and measure at several points.
- ★If any measurement is greater than the service limit, replace the wheel hub.
- ★If the drum is worn unevenly or scored, lightly turn the drum on a brake drum lathe or replace the wheel hub. Do not turn the drum beyond the service limit.

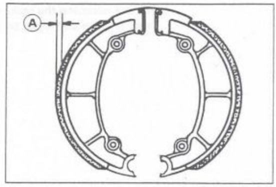


Drum Inside Diameter

Standard:	**180.00 ~ 180.16 mm**
Service Limit:	**180.75 mm**

Brake Shoe Lining Wear

- Remove the brake shoes (see Brake Panel Disassembly).
- Measure the lining thickness [A].
- ○ Use a calipers or scale, and measure at several points as shown.
- ★If any measurement is less than the service limit, replace both shoes as a set.
- ★If the lining thickness is greater than the service limit, do the following before installing the shoes.
- ○ File or sand down any high spots on the surface of the lining.
- ○ Use a wire brush to remove any foreign particles from the lining.



Shoe Lining Thickness

Standard:	**4.9 ~ 5.5 mm**
Service Limit:	**2.6 mm**

- Wash off any oil or grease with an oilles cleaning fluid such as trichloroethylene or acetone.

⚠WARNING

There cleaning fluid are usually highly flammable and harmful if breathed for prolonged periods. Be sure to heed the fluid manufacturer's warnings.

Brake Shoe Spring Inspection

- Visually inspect the brake shoe springs for breaks or distortion.
- ★If the springs are damaged in any way, replace them.

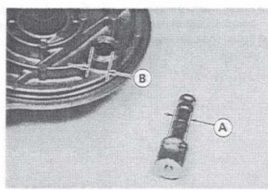
Brake Camshaft and Camshaft Hole Wear

- Remove the brake camshaft (see Brake Panel Disassembly).
- Measure the shaft diameter [A].
- ★If any measurement is less than the service limit, replace the camshaft.

Camshaft Diameter

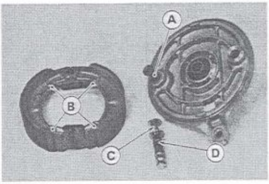
Standard:	**16.957 ~ 16.984 mm**
Service Limit:	**16.88 mm**

- Measure the inside diameter [B] of the camshaft hole in the brake panel.
- ★If any measurement is larger than the service limit, replace the brake panel.



Camshaft Hole Diameter
Standard: 17.000 ~ 17.070 mm
Service Limit: 17.15 mm

Brake Lubrication



- Clean all old grease out of the brake parts with a cloth.
- Apply high-temperature grease to the following:
  Brake Shoe Anchor Pin [A]
  Spring Ends [B]
  Cam Surfaces [C]
  Camshaft Groove [D]
- Lubricate the brake pedal by applying a multi-purpose grease to the pedal pivot shaft groove.
- Clean any excess grease from the parts before assembly.
- Lubricate the brake cable (see Brake Cable Lubrication).

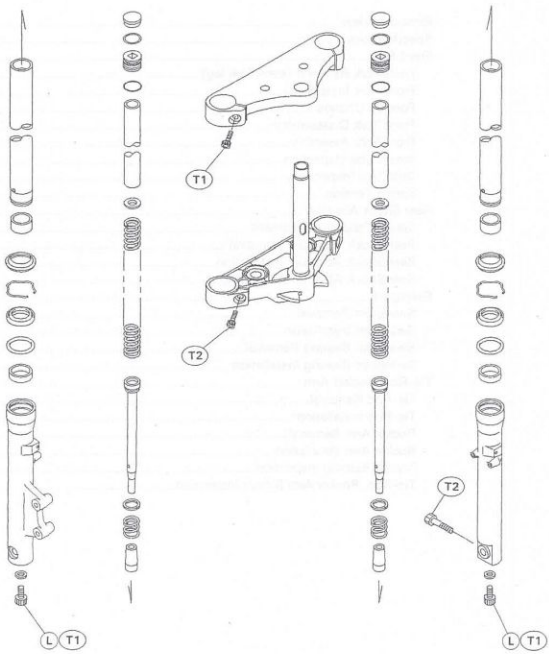
Suspension

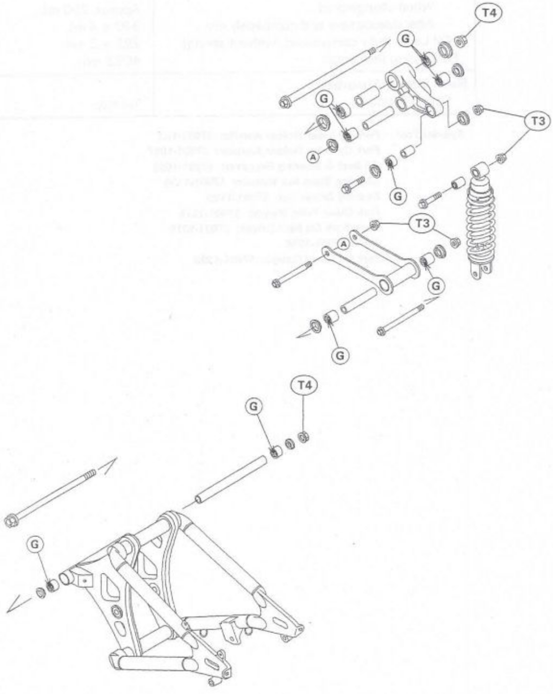
Table of Contents

Exploded View

G : Apply grease.
L : Apply non-permanent locking agent.

T1 : 20 N-m (2.0 kg-m, 14.5 ft-lb)
T2 : 34 N-m (3.5 kg-m, 25 ft-lb)
T3 : 59 N-m (6.0 kg-m, 43 ft-lb)
T4 : 98 N-m (10.0 kg-m, 72 ft-lb)




T4
G
G
T3
A
G
T3
A
G
G
T4
G
G

Specifications

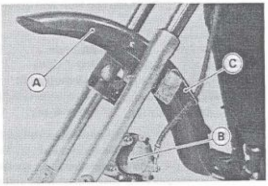
Item	Standard	Service Limit
Front Fork:		
Fork oil:		
Viscosity	SAE 10W	– – –
Amount (per side):		
When changing oil	Approx. 290 mL	– – –
After disassembly and completely dry	340 ± 4 mL	– – –
Oil Level (fully compressed, without spring)	292 ± 2 mm	– – –
Fork spring free length	469.6 mm	460 mm
Rear Shock Absorber:		(Adjustable Range)
Spring preload	1st step	1st ~ 7th steps

Special Tool – Fork Cylinder Holder Handle: 57001-183
Fork Cylinder Holder Adapter: 57001-1057
Oil Seal & Bearing Remover: 57001-1058
Steering Stem Nut Wrench: 57001-1100
Bearing Driver Set: 57001-1129
Fork Outer Tube Weight: 57001-1218
Front Fork Oil Seal Driver: 57001-1219
Jack: 57001-1238
Fork Oil Level Gauge: 57001-1290

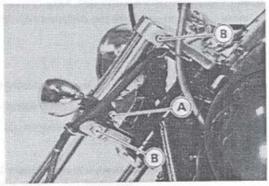
Front Fork

Front Fork Removal (each fork leg)

● Remove:
  Front Wheel (see Wheels/Tires chapter)
  Front Fender [A] (see Frame chapter)
  Caliper [B] (see Brakes chapter)
  Clamp [C]



● Loosen:
  Turn Signal Light Clamp Bolt [A]
  Front Fork Clamp Bolts [B]
● With a twisting motion, work the fork leg down and out.

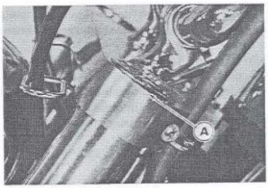


Front Fork Installation

● Install the fork so that the top end [A] of the inner tube is flush with the upper surface of the steering stem head.
● Tighten the lower fork clamp bolt and fork top bolt.

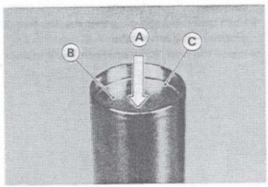
Torque – Front Fork Clamp Bolt (Lower): 34 N-m (3.5 kg-m, 25 ft-lb)
Front Fork Clamp Bolt (Upper): 20 N-m (2.0 kg-m, 14.5 ft-lb)

● Install the removed parts (see appropriate chapters).

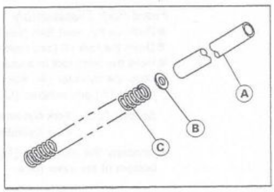


Fork Oil Change

● Remove the front fork (see Front Fork Removal).
● Push down [A] the top plug [B] to remove the ring [C], and then remove the ring and top plug.



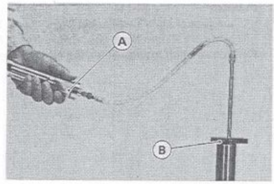
● Remove:
  Collar [A]
  Spring Seat [B]
  Fork Spring [C]
● Drain the fork oil into a suitable container.



● Pour in the type and amount of fork oil specified.

Fork Oil
Viscosity: SAE 10W
Amount (per side)
When changing oil: approx. 290 mL
After disassembly and completely dry: 340 ± 4 mL

★ If necessary, measure the oil level as follows.
○ Hold the outer tube vertically in a vise.
○ Pump the inner tube several times to expel air bubbles.
○ Wait until the oil level settles.
○ With the fork fully compressed, insert a tape measure or rod into the inner tube, and measure the distance from the top of the inner tube to the oil.



NOTE

○ Fork oil lever may also be measured using the fork oil level gauge.

Special Tool – Fork Oil Level Gauge: 57001-1290 [A]

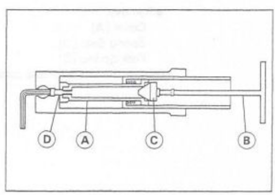
○ Set the gauge stopper [B] so that its lower side shows the oil level distance specified.

Oil Level (fully compressed, without spring)
Standard: 292 ± 2 mm (from the top of the inner tube)

○ With the fork fully compressed and without fork spring, insert the gauge tube into the inner tube and position the stopper across the top end of the inner tube.
○ Pull the handle slowly to pump out the excess oil until the oil no longer comes out.
★ If no oil is pumped out, there is insufficient oil in the inner tube. Pour in enough oil, then pump out the excess oil as shown above.
● Install the fork spring with the smaller end facing downward.
● Install:
Spring Seat
Collar
● Check the O-ring on the top plug and replace it with a new one if damaged.
● Push down the top plug to install the ring, and then fit the ring into the groove of the inner tube.
● Install the front fork (see Front Fork Installation).

Front Fork Disassembly

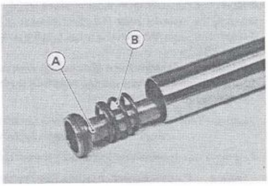
● Remove the front fork (see Front Fork Removal).
● Drain the fork oil (see Fork Oil Change).
● Hold the front fork in a vise.
● Stop the cylinder [A] from turning by using the fork cylinder holder handle [B] and adapter [C].



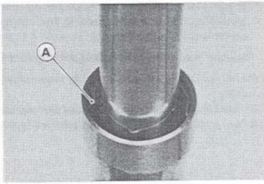
Special Tool – Fork Cylinder Holder Handle: 57001-183
Fork Cylinder Holder Adapter: 57001-1057

● Unscrew the Allen bolt [D], then take the bolt and gasket out of the bottom of the inner tube.

● Remove the cylinder unit [A] and short spring [B] from the inner tube.

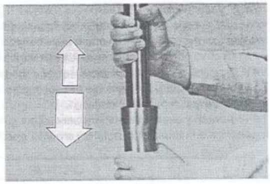


● Separate the inner tube from the outer tube as follows:
○ Slide up the dust seal.
○ Remove the retaining ring [A] from the outer tube.

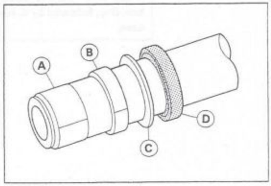


○ Grasp the inner tube and stroke the outer tube up and down several times. The shock to the fork seal separates the inner tube from the outer tube.
★ If the tubes are tight, use a fork outer tube weight.

Special Tool – Fork Outer Tube Weight: 57001-1218



● Remove the inner tube guide bushing [A], outer tube guide bushing [B], washer [C] and oil seal [D] from the inner tube.
● Remove the cylinder base from the bottom of the outer tube.

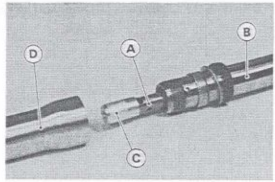


Front Fork Assembly

● Replace the following parts with new ones.
  Oil Seal
  Guide Bushings
● Install the following parts onto the inner tube.
  Dust Seal
  Retaining Ring
  Oil Seal
  Washer
  Outer Tube Guide Bushing
  Inner Tube Guide Bushing

● Insert the cylinder unit [A] and short spring into the inner tube [B].
● Install the cylinder base [C] on the cylinder unit.
● Insert the inner tube, cylinder unit, cylinder base as a set into the outer tube [D].
● Replace the bottom Allen bolt gasket with a new one.
● Stop the cylinder from turning by using the fork cylinder holder handle and adapter.

Special Tool – Fork Cylinder Holder Handle: 57001-183
Fork Cylinder Holder Adapter: 57001-1057



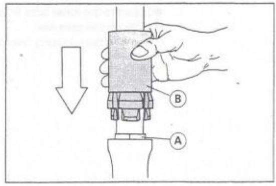
● Apply a non-permanent locking agent to the Allen bolt and tighten it.

Torque – Front Fork Bottom Allen Bolt: 20 N-m (2.0 kg-m, 14.5 ft-lb)

● When assembling the new outer tube guide bushing [A], hold the washer against the new bushing and tap the washer with the fork oil seal driver [B] until it stops.

Special Tool – Front Fork Oil Seal Driver: 57001-1219

● After installing the washer, install the oil seal by using the fork oil seal driver.
● Install the retaining ring and dust seal by hand.
● Pour in the specified type and amount of oil (see Fork Oil Change).



Inner Tube Inspection

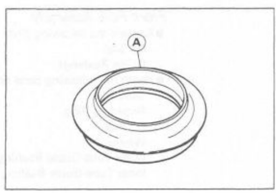
● Visually inspect the inner tube, and repair any damage.
● Nicks or rust damage can sometimes be repaired by using a wet-stone to remove sharp edges or raised areas which cause seal damage.
★ If the damage is not repairable, replace the inner tube. Since damage to the inner tube damages the oil seal, replace the oil seal whenever the inner tube is repaired or replaced.
● Temporarily assemble the inner and outer tubes, and pump them back and forth manually to check for smooth operation.

CAUTION

If the inner tube is badly bent or creased, replace it. Excessive bending, followed by subsequent straightening, can weaken the inner tube.

Dust Seal Inspection

● Inspect the dust seal [A] for any signs of deterioration or damage.
★ Replace it if necessary.



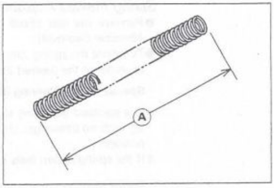
Spring Tension

●Since a spring becomes shorter as it weakens, check its free length [A] to determine its condition.

★If the spring of either fork leg is shorter than the service limit, it must be replaced. If the length of a replacement spring and that of the remaining spring vary greatly, the remaining spring should also be replaced in order to keep the fork legs balanced for motorcycle stability.

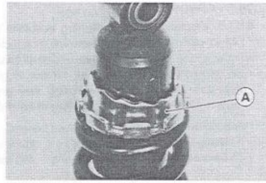
Fork Spring Free Length

Standard:	**469.6 mm**
Service Limit:	**460 mm**



Rear Shock Absorber

Spring Preload Adjustment



- Remove the rear shock absorber from the frame (see Rear Shock Absorber Removal).
- To adjust the spring force, turn the adjusting sleeve [A] on the shock absorber to the desired position with the stem nut wrench.

Special Tool − Steering Stem Nut Wrench: 57001-1100

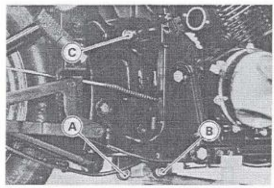
○The standard adjusting sleeve for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is 1st step from the weakest position.

★If the spring action feels too soft or too stiff, adjust it.

Spring Preload Adjustment

Adjuster Position	1	2	3	4	5	6	7
Spring Tension	------------------------------→ Stronger						

Rear Shock Absorber Removal



- Remove:
  Muffler (see Engine Top End chapter)
  Storage Box, Tool Kit Container (see Frame chapter)
- Using the jack, raise the rear wheel off the ground.

Special Tool − Jack: 57001-1238

- Remove:
  Lower Shock Absorber Bolt [A]
  Lower Tie-Rod Bolt [B]
  Upper Shock Absorber Bolt [C]
  Rear Shock Absorber

Rear Shock Absorber Installation

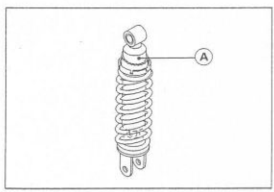
- Pack the rocker arm needle bearings with grease.
- Install the rear shock absorber so that the CAUTION label faces rearward.
- Tighten the following nuts:

Torque − Rear Shock Absorber Nuts: 59 N-m (6.0 kg-m, 43 ft-lb)
Tie-Rod Nuts: 59 N-m (6.0 kg-m, 43 ft-lb)

Rear Shock Absorber Scrapping

⚠WARNING

Since the rear shock absorber contains nitrogen gas, do not incinerate the rear shock absorber without first releasing the gas or it may explode.
Before a rear shock absorber is scrapped, drill a hole at the point shown to release the nitrogen gas completely. Wear safety glasses when drilling the hole, as the gas may blow out bits of drilled metal when the hole opens.

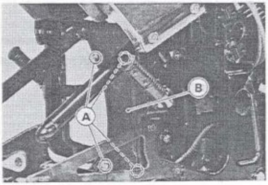


- Drill a hole at the point [A].

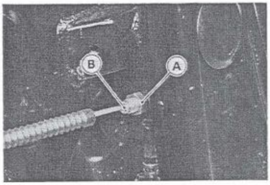
Swingarm

Swingarm Removal

● Remove:
Muffler (see Engine Top End chapter)
Rear Wheel (see Wheels/Tires chapter)
Rear Shock Absorber (see Rear Shock Absorber Removal)
Bolts [A] and Rear Wheel Mud Guard [B]

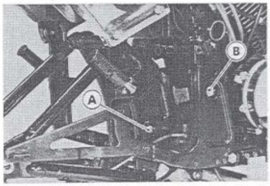


Nut [A] and Brake Cable [B]



Upper Tie-Rod Bolt [A]
Cap and Swingarm Pivot Nut [B]

● Pull off the pivot shaft and remove the swingarm.



Swingarm Installation

● Apply plenty of grease to the ball bearing, needle bearings and grease seals.

● Tighten the pivot nut.

Torque − Swingarm Pivot Shaft Nut: 98 N-m (10.0 kg-m, 72 ft-lb)

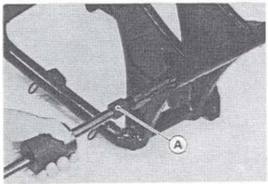
● Install the removed parts (see appropriate chapters).

Swingarm Bearing Removal

● Remove:
Swingarm
Grease Seals
Sleeve

● Remove the needle bearings using the oil seal & bearing remover [A].

Special Tool − Oil Seal & Bearing Remover: 57001-1058



Swingarm Bearing Installation

- Apply plenty of grease to the needle bearings.
- Install the bearings so that the manufacturer's marks face out.

Special Tool – Bearing Driver Set: 57001-1129

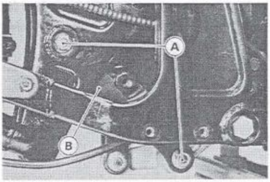
Tie-Rod, Rocker Arm

Tie-Rod Removal

- Remove the muffler (see Engine Top End chapter).
- Using the jack, raise the rear wheel off the ground.

Special Tool – Jack: 57001-1238

- Remove:
  Upper and Lower Tie-Rod Bolts [A]
  Tie-Rod [B]



Tie-Rod Installation

- Apply grease to the inside of the needle bearings and grease seals.
- Tighten the upper and lower tie-rod bolts.

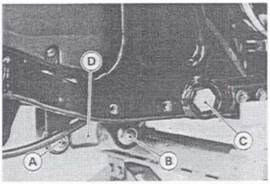
Torque – Tie-Rod Nuts: 59 N-m (6.0 kg-m, 43 ft-lb)

Rocker Arm Removal

- Remove the muffler (see Engine Top End chapter).
- Using the jack, raise the rear wheel off the ground.

Special Tool – Jack: 57001-1238

- Loosen the swingarm pivot shaft nut.
- Remove:
  Lower Rear Shock Absorber Bolt [A]
  Lower Tie-Rod Bolt [B]
  Rocker Arm Bolt [C]
  Rocker Arm [D]



Rocker Arm Installation

- Apply grease to the inside of the needle bearings and grease seals.
- Tighten the following nut:

Torque – Swingarm Pivot Shaft Nut: 98 N-m (10.0 kg-m, 72 ft-lb)
Rocker Arm Pivot Shaft Nut: 98 N-m (10.0 kg-m, 72 ft-lb)
Tie-Rod Nut: 59 N-m (6.0 kg-m, 43 ft-lb)
Rear Shock Absorber Nut: 59 N-m (6.0 kg-m, 43 ft-lb)

Needle Bearing Inspection

★If there is any doubt as to the condition of either needle bearing, replace the bearing and sleeve as a set.

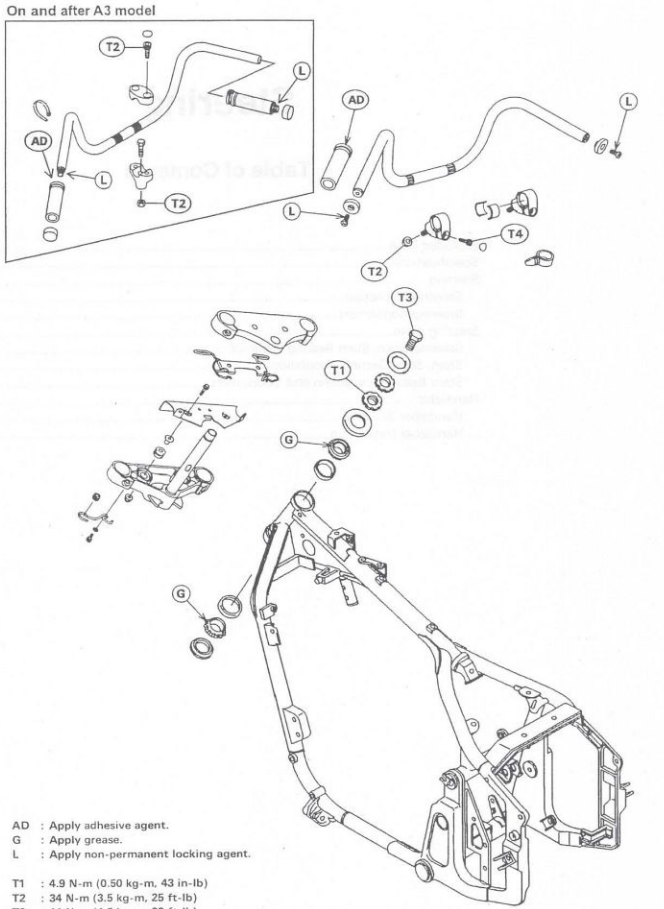
Tie-Rod, Rocker Arm Sleeve Inspection

★If there is visible damage, replace the sleeve and needle bearing as a set.

Steering

Table of Contents

Exploded View



AD : Apply adhesive agent.
G : Apply grease.
L : Apply non-permanent locking agent.

T1 : 4.9 N-m (0.50 kg-m, 43 in-lb)
T2 : 34 N-m (3.5 kg-m, 25 ft-lb)
T3 : 44 N-m (4.5 kg-m, 33 ft-lb)
T4 : 59 N-m (6.0 kg-m, 43 ft-lb)

Specifications

Special Tool – **Steering Stem Bearing Driver: 57001-137**
Steering Stem Bearing Driver Adapter: 57001-1074
Head Pipe Outer Race Press Shaft: 57001-1075
Head Pipe Outer Race Driver: 57001-1076
Steering Stem Nut Wrench: 57001-1100
Head Pipe Outer Race Driver: 57001-1106
Head Pipe Outer Race Remover: 57001-1107
Jack: 57001-1238

Steering

Steering Inspection

●Check the steering.

○Lift the front wheel off the ground using the jack.

Special Tool – Jack: 57001-1238

○With the front wheel pointing straight ahead, alternately tap each end of the handlebar. The front wheel should swing fully left and right from the force of gravity until the fork hits the stop.

★If the wheel binds or catches before the stop, the steering is too tight.

○Feel for steering looseness by pushing and pulling the forks.

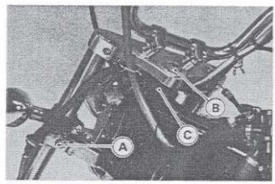
★If you feel looseness, the steering is too loose.

NOTE

○*The cables and wiring will have some effect on the motion of the fork which must be taken into account.*
Be sure the wires and cables are properly routed.

○*The bearings must be in good condition and properly lubricated in order for any test to be valid.*

Steering Adjustment



●Remove the fuel tank (see Fuel System chapter).

●Loosen:
Lower Fork Clamp Bolts (both sides) [A]
Steering Stem Head Bolt [B]

●Adjust the steering.

Special Tool – Steering Stem Nut Wrench: 57001-1100

★If the steering is too tight, loosen the stem locknut [C] a fraction of a turn.

★If the steering is too loose, tighten the nut a fraction of a turn.

NOTE

○*Turn the stem locknut 1/8 turn at a time maximum.*

●Tighten the steering stem head bolt and lower fork clamp bolts.

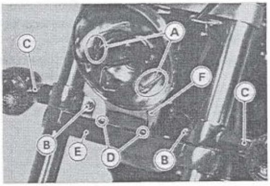
Torque – Steering Stem Head Bolt: 44 N-m (4.5 kg-m, 33 ft-lb)
Front Fork Clamp Bolts (Lower): 34 N-m (3.5 kg-m, 25 ft-lb)

●Check the steering again.

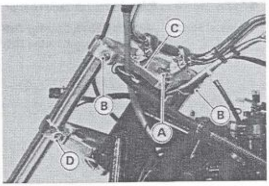
★If the steering is still too tight or too loose, repeat the adjustment.

Steering Stem

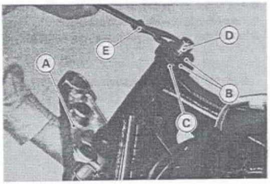
Steering Stem, Stem Bearing Removal



● Remove:
  Seat (see Frame chapter)
  Fuel Tank (see Fuel System chapter)
  Headlight Unit (see Electrical System chapter)
  Connectors [A] (disconnect)
  Bolts [B] and Turn Signal Lights [C]
  Bolts [D], Stem Base Cover [E], and Headlight Housing [F]



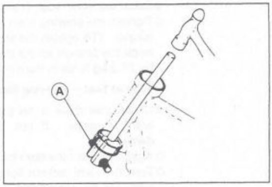
  Front Wheel (see Wheels/Tires chapter)
  Caliper
  Steering Stem Head Bolt [A] and Washer
● Loosen the upper fork clamp bolts [B], and remove the stem head [C] with the handlebar.
● Loosen the lower fork clamp bolts [D], and remove the front fork with the front fender.



● Pushing up the stem base [A], and remove the steering stem locknuts [B] and stem cap [C], then remove the steering stem [D] and stem base.

Special Tool – Steering Stem Nut Wrench: 57001-1100 [E]

● Remove the upper stem bearing inner race.



● Drive out the bearing outer races from the head pipe.

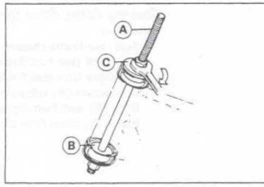
Special Tool – Head Pipe Outer Race Remover: 57001-1107 [A]

NOTE

○ *If either steering stem bearing is damaged, it is recommended that both the upper and lower bearings (including outer races) should be replaced with new ones.*

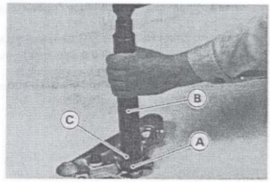
● Remove the lower stem bearing (with its grease seal) which is pressed onto the steering stem with a suitable commercially available bearing puller.

Stem, Stem Bearing Installation



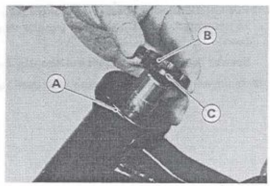
- Apply grease to the outer races, and drive them into the head pipe at the same time.

Special Tools – Head Pipe Outer Race Press Shaft: 57001-1075 [A]
Head Pipe Outer Race Drivers: 57001-1106 [B]
Head Pipe Outer Race Drivers: 57001-1076 [C]



- Apply grease to the lower inner race [A], and drive it onto the stem.

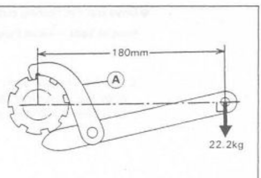
Special Tools – Steering Stem Bearing Driver: 57001-137 [B]
Steering Stem Bearing Driver Adapter: 57001-1074 [C]



- Apply grease to the upper inner race, and install it in the head pipe.
- Insert the stem into the head pipe.
- Install the stem cap [A], and hand tighten the steering stem locknuts.

NOTE

○*Install the steering stem locknut [B] so that the stepped side [C] faces down.*



- Settle the inner races in place as follows:

○Tighten the steering stem locknut to 39 N-m (4.0 kg-m, 29 ft-lb) of torque. (To tighten the steering stem locknut to the specified torque, hook the wrench on the stem locknut, and pull the wrench at the hole by 22.2 kg force in the direction shown.)

Special Tool – Steering Stem Nut Wrench: 57001-1100 [A]

○Check that there is no play and the steering stem turns smoothly without rattles. If not, the bearings on the inner races may be damaged.
○Again back out the stem locknut a fraction of a turn until it turns lightly.
○Turn the stem locknut lightly clockwise until it just becomes hard to turn. Do not overtighten, or the steering will be too tight.

Torque – Steering Stem Nut: 4.9 N-m (0.50 kg-m, 43 in-lb)

- Install the stem head and washer, and tighten the stem head bolt.

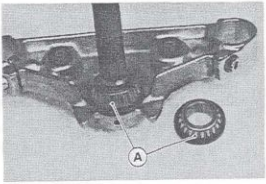
Torque – Steering Stem Head Bolt : 44 N-m (4.5 kg-m, 33 ft-lb)

- Install the removed parts (see appropriate chapters).

⚠WARNING

Do not impede the handlebar turning by routing the cables, harnesses and hoses improperly (see General Information chapter).

Stem Bearing Inspection and Lubrication



- Remove the steering stem.
- Using a high flash-point solvent, wash the upper and lower tapered roller bearings in the cages, and wipe the upper and lower outer races, which are press-fitted into the frame head pipe, clean off grease and dirt.
- Visually check the outer races and the rollers.

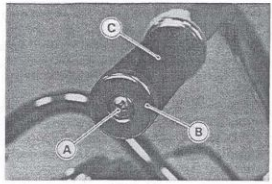
★Replace the bearing assemblies if they show wear or damage.

- Pack the upper and lower tapered roller bearings [A] in the cages with grease, and apply a light coat of grease to the upper and lower outer races.
- Install the steering stem, and adjust the steering.

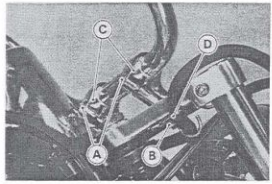
Handlebar

Handlebar Removal

- Remove:
  Clutch Cable Upper End
  Left Handlebar Switch Housing
  Brake Master Cylinder
  Right Handlebar Switch Housing
  Screw [A], Weight [B], and Throttle Grip [C]



  Handlebar Clamp Bolts [A]
  Nuts [B], Handlebar Holders [C], and Hose Clamp [D]
- Remove the collars and handlebar holders from the handlebar.

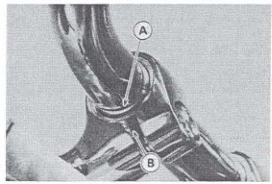


Handlebar Installation

- Install the collars and handlebar holders onto the handlebar, and tighten the handlebar clamp bolts lightly.
- Install the handlebar holder and handlebar on the steering stem head, and tighten the holder nuts.

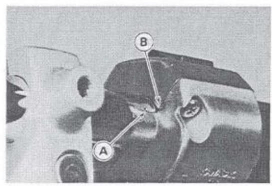
Torque – Handlebar Holder Mounting Nuts: 34 N-m (3.5 kg-m, 25 ft-lb)

- Align the punch mark [A] on the handlebar with the gap [B] of the handlebar holder clamp.
- ○ Check that the collars are in place.
- Tighten the handlebar clamp bolts.



Torque – Handlebar Clamp Bolts : 59 N-m (6.0 kg-m, 43 ft-lb)

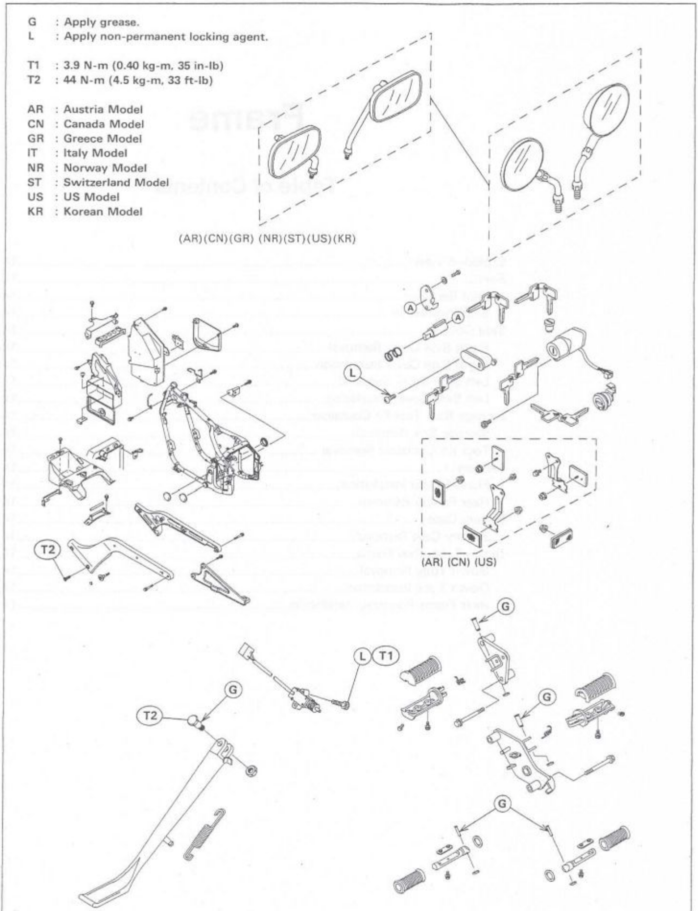
- Apply a non-permanent locking agent to the threads of the handlebar grip screw, and install the weight with it.
- Align the punch mark [A] on the handlebar with the mating surface [B] of the left handlebar switch housing clamp.
- Check and adjust the following.
  Throttle Grip
  Front Brake
  Clutch

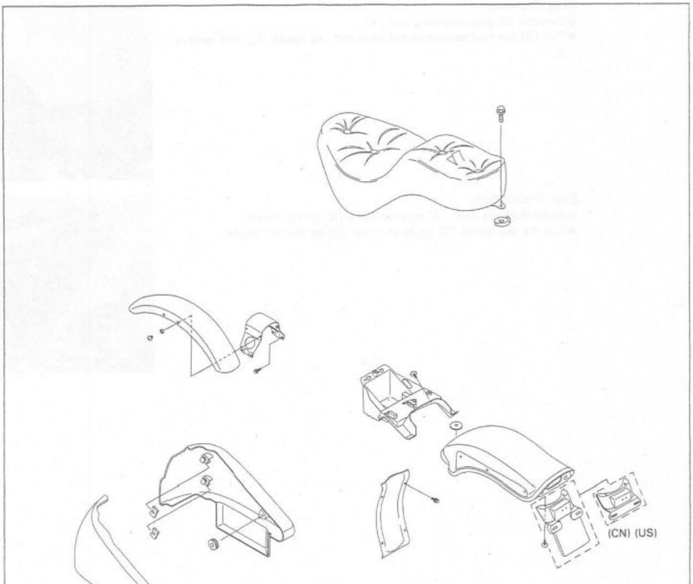


Frame

Table of Contents

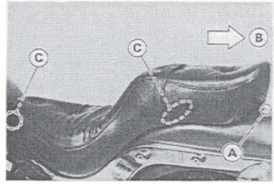
Exploded View




(CN) (US)
(IT)

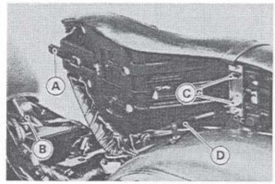
Seat

Seat Removal



- Remove the seat mounting bolt [A].
- Pull [B] the seat to unhook the front and rear hooks [C], and remove it.

Seat Installation

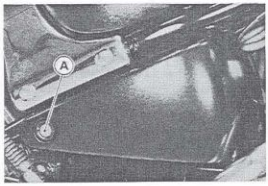


- Insert the front hook [A] into the brace [B] on the frame.
- Slip the rear hooks [C] under the loop [D] on the rear fender.

Side Covers

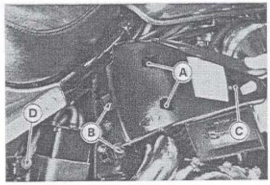
Right Side Cover Removal

- Insert the ignition switch key into the right side cover lock [A], turning the key counterclockwise, pulling out the rear of the cover, and remove it forward.



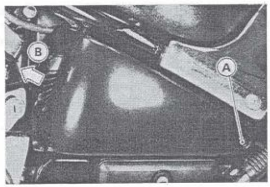
Right Side Cover Installation

- Fit the front projections [A] into the slot [B] on the frame, and then fit the rear projection [C] into the hole [D] of the bracket.
- Lock the cover with the ignition switch key.



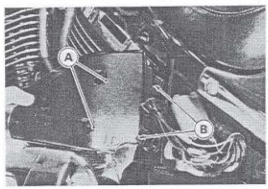
Left Side Cover Removal

- Remove the screw [A], and pull [B] the left cover forward.



Left Side Cover Installation

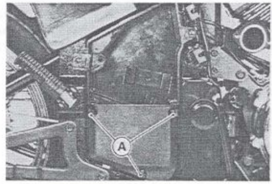
- Fit the projection [A] into the slot [B] on the frame, and tighten the screw.



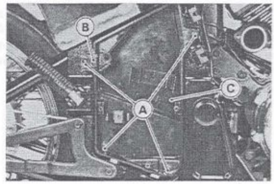
Storage Box, Tool Kit Container

Storage Box Removal

● Remove:
  Muffler (see Engine Top End chapter)
  Right Side Cover (see Right Side Cover Removal)
  Screws [A] and Lower Cover
  Canister and Separator (for California Model)

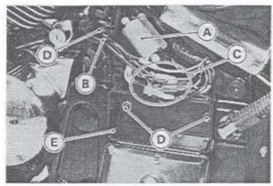


  Bolts [A], Bracket [B], and Storage Box Base [C]



Tool Kit Container Removal

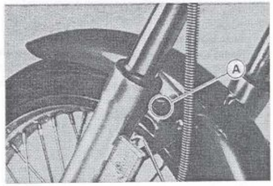
● Remove the left side cover (see Left Side Cover Removal).
● Open the tool kit cover with the ignition switch key, and take out the tool kit.
● Remove:
  Ignition Coil [A]
  Clamp [B]
  Connectors [C]
  Bolts [D]
  Tool Kit Box [E]



Fenders

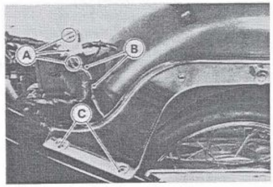
Front Fender Installation

- Install the front fender so that the arrow mark [A] faces forwards.

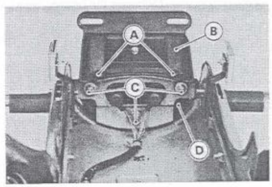


Rear Fender Removal

- Remove:
  Seat (see Seat Removal)
  Connectors [A]
  Rear Fender Bolts [B]
  Rear Frame Mounting Bolts [C] (both sides)
  Rear Fender Assembly



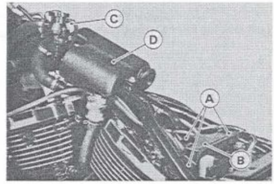
- Remove the following parts from the rear fender.
  Rear Frames
  Bolts [A] and License Plate Bracket [B]
  Nuts [C] and Tail/Brake Light Unit [D]



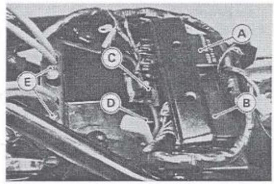
Battery Case

Battery Case Removal

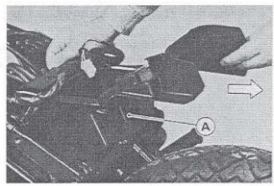
● Remove:
  Seat (see Seat Removal)
  Rear Fender (see Rear Fender Removal)
  Fuel Tank (see Fuel System chapter)
  Bolts [A] and Battery Cover [B]
  Battery
  Coolant Hose [C]
  Surge Tank [D]



  IC Igniter [A]
  Junction Box [B]
  Starter Relay, Main Fuse [C]
  Turn Signal Relay [D]
  Choke Cable Holder Screw [E]
  Coolant Hose
  Evapo. System Hoses (for California Model)



● Remove the battery case [A] from the frame.

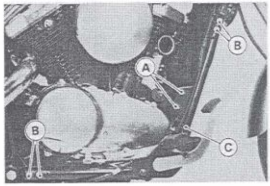


Down Tube, Rear Frame

Down Tube Removal

● Remove:
  Front Muffler (see Engine Top End chapter)
  Clutch Cable Clamps
  Engine Bracket Bolts [A]
  Bolts [B] and Down Tube Assembly [C]

★ If necessary, remove the footpeg and brake pedal (see brakes chapter).



Down Tube Installation

● Tighten the mounting bolts.

Torque – Down Tube Mounting Bolts: 44 N-m (4.5 kg-m, 33 ft-lb)

● Tighten the engine bracket bolts.

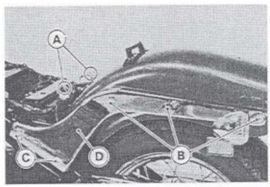
Torque – Engine Mounting Bracket Bolts: 23 N-m (2.3 kg-m, 16.5 ft-lb)

Rear Frame Removal/Installation

● Remove:
  Seat (see Seat Removal)
  Turn Signal Light Lead Connectors [A]
  Bolts and Hook Bolts [B]
  Rear Frame Mounting Bolts [C]
  Rear Frame [D]
  Turn Signal Light

● When installing the rear frame, tighten the mounting bolts.

Torque – Rear Frame Mounting Bolts: 44 N-m (4.5 kg-m, 33 ft-lb)



Down Tube, Rear Frame

Down Tube Removal

- Remove:
  - Front Master Cylinder [illegible] (Top [illegible])
  - [illegible] Cover
  - Engine Mounting Bolts
  - Bolts (?) and Down Tube Assembly (?)
- If necessary, remove the [illegible] and [illegible] (for [illegible]).

Down Tube Installation

- Tighten the mounting bolts.

Torque – Down Tube Mounting Bolts: [illegible]

- Tighten the engine mounting bolts.

Torque – Engine Mounting Bracket Bolts: [illegible]

Rear Frame Removal (Rear Frame)

- Remove:
  - Seat (see Seat Removal)
  - Turn Signal Light Lead Connectors (A)
  - Rear and Hook Bolts (B)
  - Rear Frame Mounting Bolts (C)
  - Rear Fender (D)
  - Turn Signal Light
- When installing, tighten the mounting bolts.

Torque – Rear Frame Mounting Bolts: [illegible]

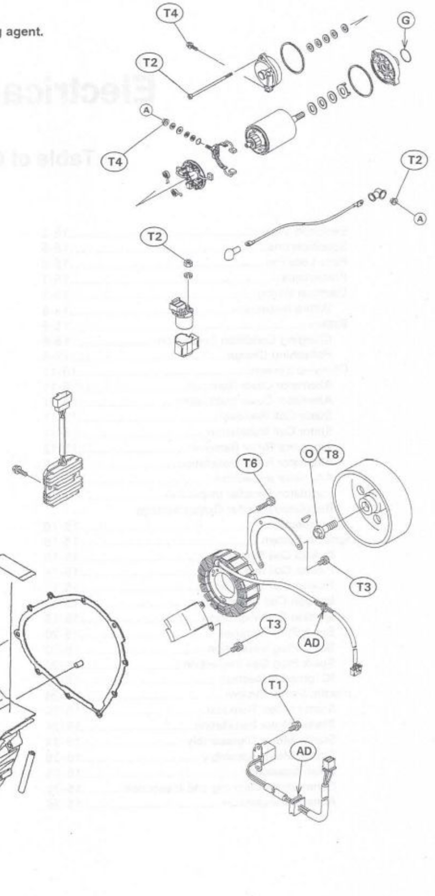
Electrical System

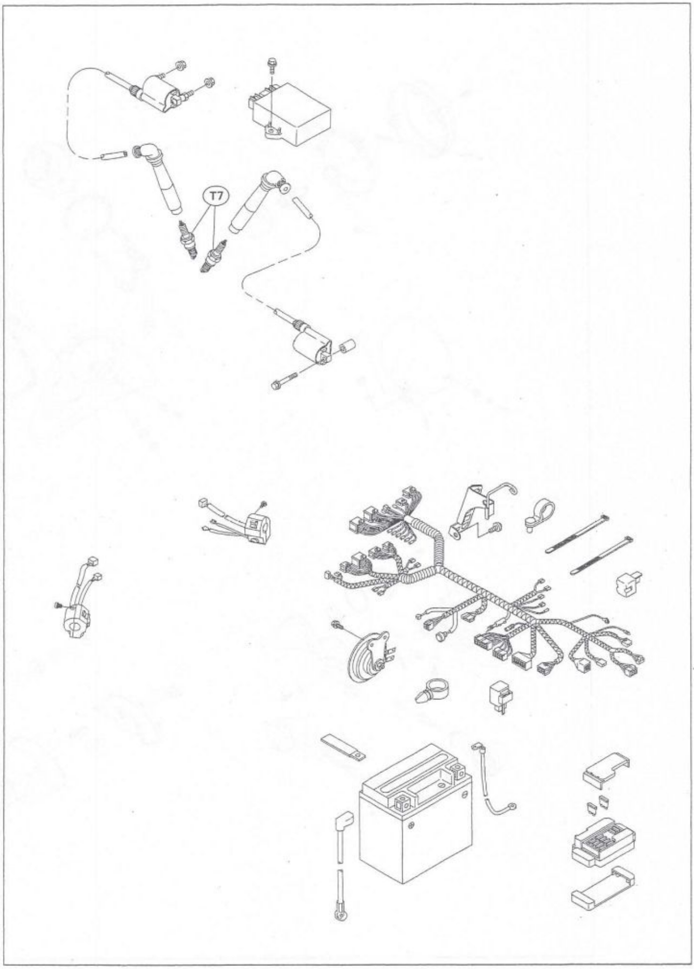
Table of Contents

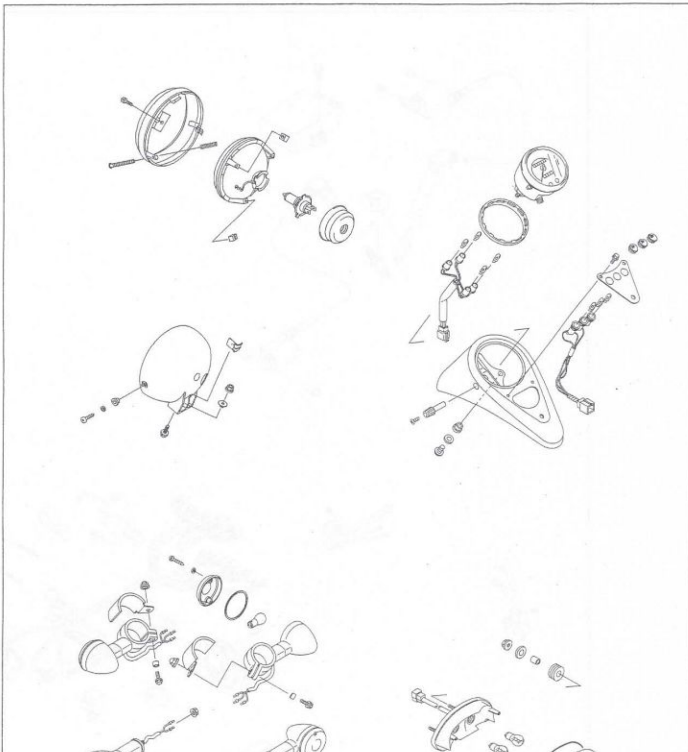
Exploded View

AD: Apply adhesive agent.
G: Apply grease.
L: Apply non-permanent locking agent.
O: Apply oil.

T1: 2.9 N·m (0.30 kg·m, 26 in·lb)
T2: 4.9 N·m (0.50 kg·m, 43 in·lb)
T3: 7.8 N·m (0.80 kg·m, 69 in·lb)
T4: 11 N·m (1.1 kg·m, 95 in·lb)
T5: 12 N·m (1.2 kg·m, 104 in·lb)
T6: 13 N·m (1.3 kg·m, 113 in·lb)
T7: 18 N·m (1.8 kg·m, 13.0 ft·lb)
T8: 157 N·m (16.0 kg·m, 115 ft·lb)




T7

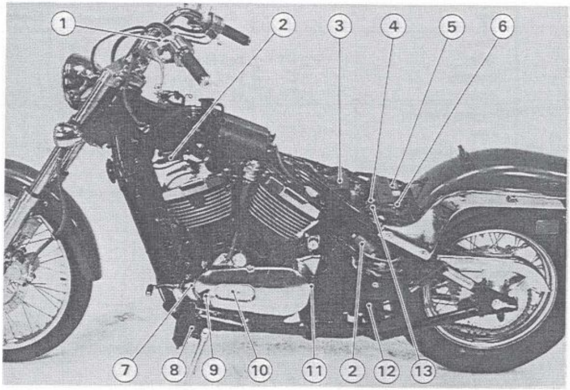


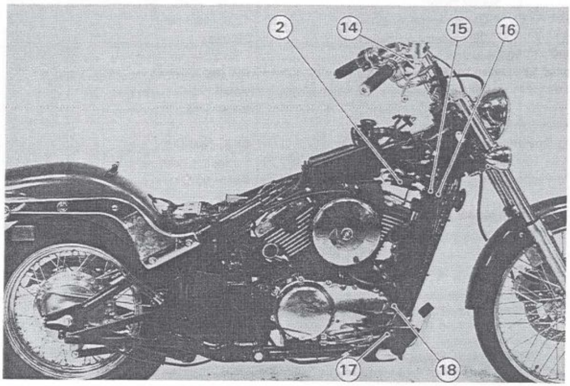
Specifications

Item	Standard	Service Limit
Battery:		
Type	Sealed battery	---
Capacity	12 V 12Ah	---
Voltage	12.6 V or more	---
Charging System:		
Type	Three-phase AC	---
Charging voltage	14 ~ 15 V @4 000 r/min (rpm), night	---
Alternator output voltage	50 ~ 80 V	---
Stator coil resistance	0.3 ~ 0.5 Ω	---
Ignition System:		
Pickup coil resistance	380 ~ 570 Ω	---
Ignition coil:		
3 needle arcing distance	6 mm or more	---
Winding resistance:		
Primary windings	2.3 ~ 3.5 Ω	---
Secondary windings	12.0 ~ 18.0 kΩ	---
Spark plug:		
Type	NGK CR7E or ND U22ESR-N	---
Gap	0.7 ~ 0.8 mm	---
IC igniter internal resistance	Refer to page 15-21	---
Electric Starter System:		
Starter motor:		
Carbon brush length	12.0 ~ 12.5 mm	5.5 mm
Commutator diameter	28 mm	27 mm
Switch and Sensor:		
Rear brake light switch timing	On after about 15 mm pedal travel	---
Engine oil pressure switch connections	When engine is stopped: ON	---
	When engine is running: OFF	---
Fan Switch connections:		
Rising temperature	From OFF to ON @93 ~ 103°C (199 ~ 217°F)	---
Falling temperature	From ON to OFF @91 ~ 95°C (196 ~ 203°F)	---
Water temperature sensor resistance:		
Rising temperature	From OFF to ON @113 ~ 117°C (235 ~ 243°F)	---
Falling temperature	From ON to OFF @below 108°C (226°F)	---

Special Tool - **Rotor Puller, M16/M18/M20/M22 × 1.5: 57001–1216**
Flyweel Holder: 57001–1313
Igniter Checker: 57001–1378
Hand Tester: 57001–1394
Spark Plug Wrench, 16 mm (Owner's Tool): 92110–1132

Parts Location





1. Starter Lockout Switch
2. Ignition Coils
3. Battery
4. Starter Relay and Main Fuse
5. IC Igniter
6. Junction Box
7. Oil Pressure Switch
8. Side Stand Switch
9. Pickup Coil
10. Alternator
11. Neutral Switch
12. Regulator/Rectifier
13. Turn Signal Relay
14. Front Brake Light Switch
15. Water Temperature Sensor
16. Radiator Fan Switch
17. Rear Brake Light Switch
18. Starter Motor

Precautions

There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

○ Do not reverse the battery lead connections. This will burn out the diodes on the electrical parts.

○ Always check battery condition before condemning other parts of an electrical system A fully charged battery is a must for conducting accurate electrical system tests.

○ The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.

○ To prevent damage to electrical parts, do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running.

○ Because of the large amount of current, never keep the starter button pushed when the starter motor will not turn over, or the current may burn out the starter motor windings.

○ Do not use a meter illumination bulb rated for other than voltage or wattage specified in the wiring diagram, as the meter or gauge panel could be warped by excessive heat radiated from the bulb.

○ Take care not to short the leads that are directly connected to the battery positive (+) terminal to the chassis ground.

○ Troubles may involve one or in some cases all items.
Never replace a defective part without determining what CAUSED the failure. If the failure was caused by some other item or items, they too must be repaired or replaced, or the new replacement will soon fail again.

○ Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. Poor wires and bad connections will affect electrical system operation.

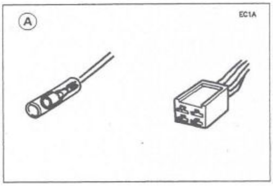
○ Measure coil and winding resistance when the part is cold (at room temperature).

○ Color Codes:

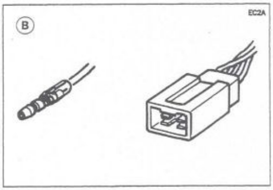
BK	Black	G	Green	P	Pink
BL	Blue	GY	Gray	PU	Purple
BR	Brown	LB	Light blue	R	Red
CH	Chocolate	LG	Light green	W	White
DG	Dark green	O	Orange	Y	Yellow

○ Electrical Connectors

Female Connectors [A]

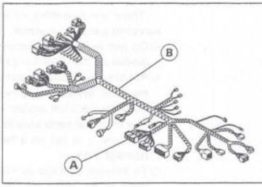


Male Connectors [B]



Electrical Wiring

Wiring Inspection



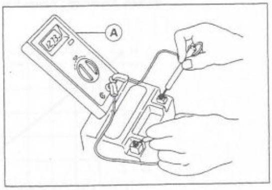
- ●Visually inspect the wiring for signs of burning, fraying, etc.
- ★If any wiring is poor, replace the damaged wiring.
- ●Pull each connector [A] apart and inspect it for corrosion, dirt, and damage.
- ★If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.
- ●Check the wiring for continuity.
- ○Use the wiring diagram to find the ends of the lead which is suspected of being a problem.
- ○Connect the hand tester between the ends of the leads.

Special Tool – Hand Tester: 57001-1394

- ○Set the tester to the x 1 Ω range, and read the tester.
- ★If the tester does not read 0 Ω, the lead is defective. Replace the lead or the wiring harness [B] if necessary.

Battery

Charging Condition Inspection



Battery charging condition can be checked by measuring battery terminal voltage.

- Remove the seat (see Frame chapter).
- Disconnect the battery terminal leads.

CAUTION

Be sure to disconnect the negative terminal lead first.

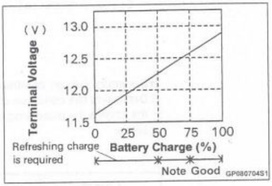
- Measure the battery terminal voltage.

NOTE

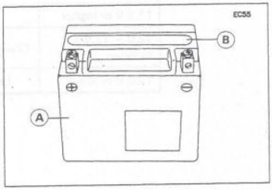
○ *Measure with a digital voltmeter [A] which can be read to one decimal place voltage.*

★ If the reading is below the specified, refreshing charge is required.

Battery Terminal Voltage
Standard: 12.6 V or more



Refreshing Charge



- Disconnect the battery terminal leads (see Charging Condition Inspection).
- Remove the battery [A].
- Refresh-charge by following method according to the battery terminal voltage.

CAUTION

This battery is sealed type. Never remove sealing caps [B] even at charging. Never add water. Charge with current and time as stated below.

Terminal Voltage: 11.5 ~ less than 12.6 V
Standard Charge
1.4 A x 5 ~ 10 h (see following chart)
Quick Charge
6.0 A x 1.0 h

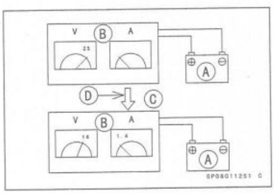
CAUTION

If possible, do not quick charge. If the quick charge is done due to unavoidable circumstances, do standard charge later on.

Terminal Voltage : less than 11.5 V
Charging Method : 1.4 A x 20 h

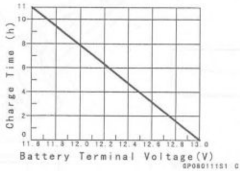
NOTE

○ *Raise the voltage initially (25 V as maximum), and charge for about 5 minutes as a yardstick. If ammeter shows no change in current after 5 minutes, you need a new battery. The current, if it can flow into the battery, tends to become excessive. Adjust the voltage as often as possible to keep the current at standard value (1.4 A).*



Battery [A]
Battery Changer [B]
Standard Value [C]
Current start to flow [D]

Battery Standard Charge Time Chart



● Determine battery condition after refreshing charge.

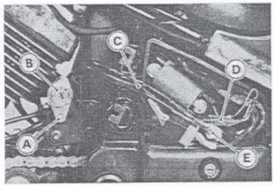
○ Determine the condition of the battery 30 minutes after completion of the charge by measuring the terminal voltage according to the table below.

Criteria	Judgement
12.6 V or higher	Good
12.0 ~ 12.6 V or lower	Charge insufficient → Recharge.
12.0 V or lower	Unserviceable → Replace

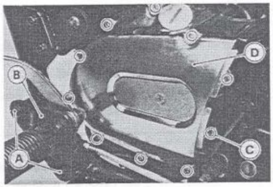
Charging System

Alternator Cover Removal

- Drain the engine oil (see Lubrication System chapter).
- Remove:
  Engine Sprocket Cover (see Final Drive chapter)
  Left Side Cover (see Frame chapter)
  Bolt [A] and Ignition Switch [B]
  Clamp [C]
  Alternator Lead Connector [D]
  Pickup Coil Lead Connector [E]

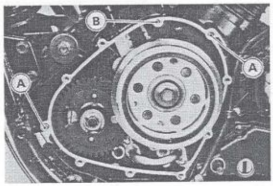


Bolts [A] and Footpeg Bracket [B]
Bolts [C] and Alternator Cover [D]



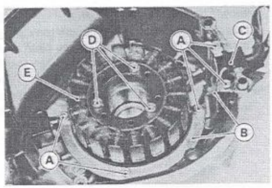
Alternator Cover Installation

- Check to see that the knock pins [A] are in place.
- Apply a non-permanent locking agent to the threads of the cover bolt [B].



Stator Coil Removal

- Remove:
  Alternator Cover (see Alternator Cover Removal)
  Bolts [A] and Clamps [B]
  Pickup Coil and Alternator Lead Grommets [C]
  Stator Coil Bolts [D]
- Remove the stator coil [E] from the alternator cover.



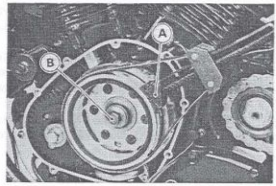
Stator Coil Installation

- Tighten the stator coil bolts.
  Torque − Stator Coil Bolts: 13 N-m (1.3 kg-m, 113 in-lb)
- Apply adhesive agent to the circumference of the alternator lead and pickup coil lead grommets, and fit the grommets into the notch of the cover securely.
  ○ First install the alternator lead grommet and then pickup coil lead grommet.
- Secure the alternator lead and pickup coil lead with clamps, and tighten the bolts.
  Torque − Alternator Lead Clamp Bolts: 7.8 N-m (0.80 kg-m, 69 in-lb)
- Install the alternator cover (see Alternator Cover Instalaltion).

Alternator Rotor Removal

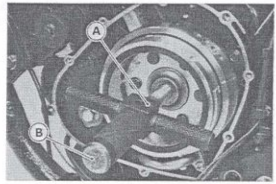
- Remove:
  Alternator Cover (see Alternator Cover Removal)
- Wipe oil off the outer circumference of the rotor.
- Hold the alternator rotor steady with the flywheel holder [A], and remove the rotor bolt [B].

Special Tool – Flywheel Holder: 57001-1313



- Using the rotor puller [A], remove the alternator rotor from the crankshaft.

Special Tool – Rotor Puller, M16/M18/M20/M22 x 1.5: 57001-1216



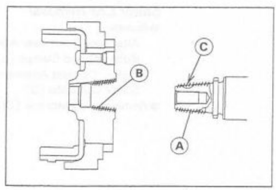
NOTE

○*Screw in the puller while tapping the head [B] of the puller with a hammer.*

CAUTION
Do not attempt to strike the alternator rotor itself. Striking the rotor can cause the magnets to lose their magnetism.

Alternator Rotor Installation

- Using a cleaning fluid, clean off any oil or dirt on the following portions and dry them with a clean cloth.
  [A] Crankshaft Tapered Portion
  [B] Alternator Rotor Tapered Portion
- Fit the woodruff key securely in the slot [C] in the crankshaft before installing the alternator rotor.

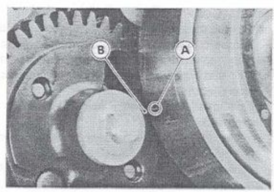


- When installing the alternator rotor, align the rotor mark [A] with the left balancer mark [B].
- Apply oil to the threads and seating surface of the alternator rotor bolt.
- Tighten the alternator rotor bolt while holding the alternator rotor steady with the flywheel holder.

Special Tool – Flywheel Holder: 57001–1313

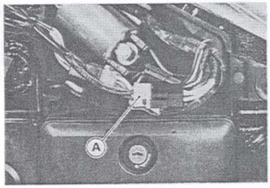
Torque – Alternator Rotor Bolt: 157 N·m (16.0 kg·m, 115 ft·lb)

- Install the alternator cover (see Alternator Cover Installation).



Alternator Inspection

There are three types of alternator failures: short, open (wire burned out), or loss in rotor magnetism. A short or open in one of the coil wires will result in either a low output, or no output at all. A loss in rotor magnetism, which may be caused by dropping or hitting the alternator, by leaving it near an electromagnetic field, or just by aging, will result in low output.



●To check the alternator output voltage, do the following procedures.
○Turn off the ignition switch.
○Remove the left side cover (see Frame chapter).
○Disconnect the alternator lead connector [A].
○Connect the hand tester as shown in the table 1.
○Start the engine.
○Run it at the rpm given in the table 1.
○Note the voltage readings (total 3 measurements).

Table 1 Alternator Output Voltage

Tester	Connections		Reading
Range	Tester (+) to	Tester (−) to	@ 4,000 rpm
250 V AC	One black lead	Another black lead	50 ~ 80 V

★If the output voltage shows the value in the table, the alternator operates properly and the regulator/rectifier is damaged. A much lower reading than that given in the table indicates that the alternator is defective.
●Check the stator coil resistance as follows:
○Stop the engine.
○Connect the hand tester as shown in the table 2.
○Note the readings (total 3 measurement).

Table 2 Stator Coil Resistance

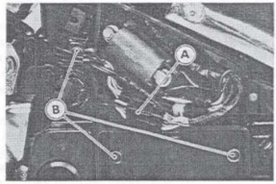
Tester	Connections		Reading
Range	Tester (+) to	Tester (−) to	
× 1 Ω	One black lead	Another black lead	0.3 ~ 0.5 Ω

★If there is more resistance than shown in the table, or no hand tester reading (infinity) for any two leads, the stator has an open lead and must be replaced. Much less than this resistance means the stator is shorted, and must be replaced.
●Using the highest resistance range of the hand tester, measure the resistance between each of the black leads and chassis ground.
★Any hand tester reading less than infinity (∞) indicates a short, necessitating stator replacement.
★If the stator coils have normal resistance, but the voltage check showed the alternator to be defective; then the rotor magnets have probably weakened, and the rotor must be replaced.

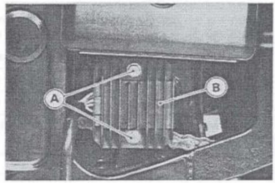
Special Tool − Hand Tester: 57001-1394

Regulator/Rectifier Inspection

●Remove:
  Left Side Cover (see Frame chapter)
  Connector [A] (disconnect)
  Tool Kit Container Bolts [B]

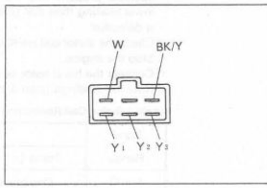


  Bolts [A] and Regulator/Rectifier [B]



Rectifier Circuit Check:

●Check conductivity of the following pair of terminals.



Rectifier Circuit Inspection

Tester connection	W-Y1,	W-Y2,	W-Y3
	BK/Y-Y1,	BK/Y-Y2,	BK/Y-Y3

★The resistance should be low in one direction and more than ten times as much in the other direction. If any two leads are low or high in both directions, the rectifier is defective and must be replaced.

NOTE

○*The actual meter reading varies with the meter used and the individual rectifier, but, generally speaking the lower reading should be from zero to one half the scale.*

Regulator Circuit Check:

To test the regulator out of circuit, use three 12 V batteries and a test light (12 V 3 ~ 6 W bulb in a socket with leads).

CAUTION
The test light works as an indicator and also a current limiter to protect the regulator/rectifier from excessive current. Do not use an ammeter instead of a test light.

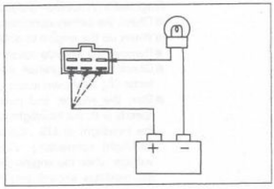
●Check to be sure the rectifier circuit is normal before continuing.

Regulator Circuit Test-1st Step:

- Connect the test light and the 12 V battery to the regulator/rectifier as shown.
- Check Y 1, Y2, and Y3 terminal respectively.

★If the test light turns on, the regulator/rectifier is defective. Replace it.

★If the test light does not turn on, continue the test.

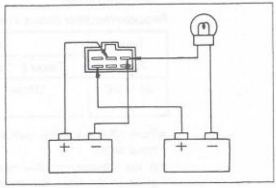


Regulator Circuit Test-2nd Step:

- Connect the test light and the 12 V battery in the same manner as specified in the "Regulator Circuit Test-1st Step".
- Apply 12 V to the BR terminal.
- Check Y 1, Y2, and Y3 terminal respectively.

★If the test light turns on, the regulator/rectifier is defective. Replace it.

- If the test light does not turn on, continue the test.

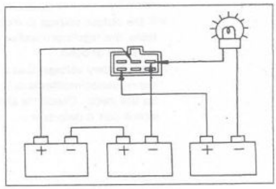


Regulator Circuit Test-3rd Step:

- Connect the test light and the 12 V battery in the same manner as specified in the "Regulator Circuit Test-1st Step".
- Momentarily apply 24 V to the BR terminal by adding a 12 V battery.
- Check Y 1, Y2, and Y3 terminals respectively.

CAUTION

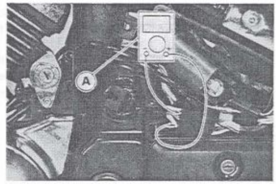
Do not apply more than 24 V to the regulator/rectifier and do not leave the 24 V applied for more than a few seconds, or the unit will be damaged.



★If the test light did not light when the 24 V was applied momentarily to the BR terminal, the regulator/rectifier is defective. Replace it.

★If the regulator/rectifier passes all of the tests described, it may still be defective. If the charging system still does not work properly after checking all of the components and the battery, test the regulator/rectifier by replacing it with a known good unit.

Regulator/Rectifier Output Voltage Inspection



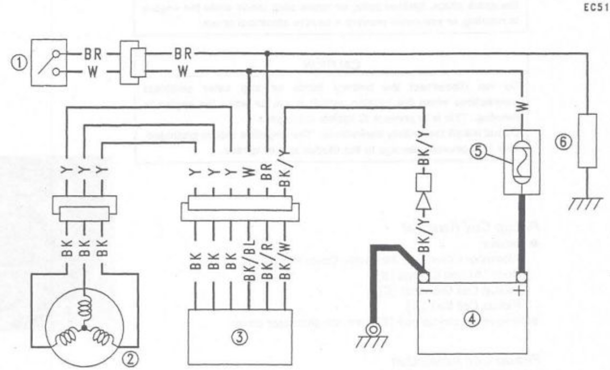
● Check the battery condition (see Battery section).
● Warm up the engine to obtain actual alternator operating conditions.
● Remove the left side covers (see Frame chapter).
● Check that the ignition switch is turned off, and connect the hand tester [A] as shown in the table.
● Start the engine, and note the voltage readings at various engine speeds with the headlight turned on and then turned off. (To turn off the headlight of US , Canada and Australia models, disconnect the headlight connector.) The readings should show nearly battery voltage when the engine speed is low, and, as the engine speed rises, the readings should also rise. But they must be kept under the specified voltage.

Regulator/Rectifier Output Voltage

Tester	Connections		Reading
Range	Tester (+) to	Tester (−) to	
25 V DC	White	Black/Yellow	14 ~ 15 V

● Turn off the ignition switch to stop the engine, and disconnect the hand tester.
★ If the regulator/rectifier output voltage is kept between the values given in the table, the charging system is considered to be working normally.
★ If the output voltage is much higher than the values specified in the table, the regulator/rectifier is defective or the regulator/rectifier leads are loose or open.
★ If the battery voltage does not rise as the engine speed increases, then the regulator/rectifier is defective or the alternator output is insufficient for the loads. Check the alternator and regulator/rectifier to determine which part is defective.

Charging System Circuit



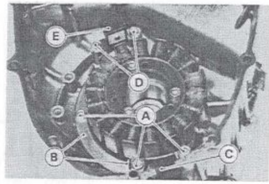
1. Ignition Switch
2. Alternator
3. Regulator/Rectifier
4. Battery
5. Main Fuse 30A
6. Load

⚠WARNING

The ignition system produces extremely high voltage. Do not touch the spark plugs, ignition coils, or spark plug leads while the engine is running, or you could receive a severe electrical shock.

CAUTION

Do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent IC igniter damage.
Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the diodes and IC igniter.



Pickup Coil Removal

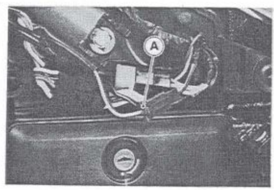
- Remove:
  Alternator Cover (see Alternator Cover Removal)
  Bolts [A] and Clamps [B]
  Pickup Coil Grommet [C]
  Pickup Coil Bolt [D]
- Remove the pickup coil [E] from the alternator cover.

Pickup Coil Installation

- Tighten the pickup coil bolts.

Torque − Pickup Coil Bolts: 2.9 N-m (0.30 kg-m, 26 in-lb)

- Install the pickup coil lead on the alternator cover (see Stator Coil Installation).



Pickup Coil Inspection

- Remove:
  Left Side Cover (see Frame chapter)
  Pickup Coil Lead Connector [A]
- Set the hand tester to the x 100 Ω range and connect it between the terminals in the connector.

★If there is more resistance than the specified value, the coil has an open lead and must be replaced. Much less than this resistance means the coil is shorted, and must be replaced.

Pickup Coil Resistance:
Standard: 380 ~ 570 Ω

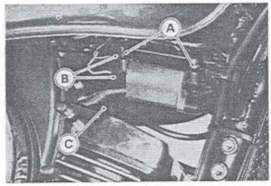
- Using the highest resistance range of the tester, measure the resistance between the pickup coil leads and chassis ground.

★Any tester reading less than infinity (∞) indicates a short, necessitating replacement of the pickup coil assembly.

Ignition Coil Removal

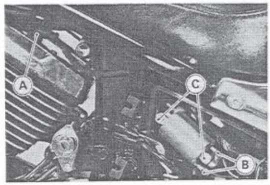
Front:

● Remove:
  Nuts [A]
  Primary Lead Connectors [B]
  Spark Plug Cap [C]
  Ignition Coil



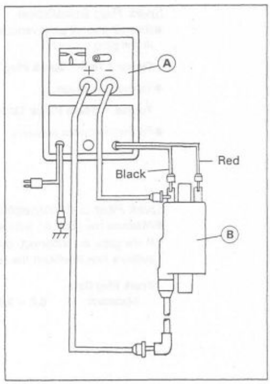
Rear:

  Left Side Cover and Seat (see Frame chapter)
  Spark Plug Cap [A]
  Primary Lead Connectors [B]
  Bolts [C], Collars, and Ignition Coil



Ignition Coil Inspection

● Remove the ignition coils(see Ignition Coil Removal).
● Measure the arcing distance with the suitable commercially available coil tester [A] to check the condition of the ignition coil [B].
● Connect the ignition coil (with the spark plug cap left attached at the end of the spark plug lead) to the tester in the manner prescribed by the manufacturer and measure the arcing distance.



Ignition Coil Arcing Distance:
Standard: **6 mm or more**

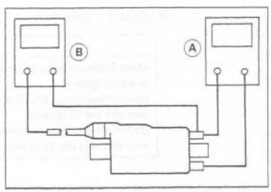
⚠WARNING

To avoid extremely high voltage shocks, do not touch the coil body or leads.

★ If the distance reading is less than the specified value, the ignition coil or spark plug caps are defective.
● To determine which part is defective, measure the arcing distance again with the spark plug caps removed from the ignition coil. Remove the caps by turning them counterclockwise.
★ If the arcing distance is subnormal as before, the trouble is with the ignition coil itself. If the arcing distance is now normal, the trouble is with the spark plug caps.
★ If the coil tester is not available, the coil can be checked for a broken or badly shorted winding with the hand tester.

NOTE

○ *The hand tester cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.*



● Measure the primary winding resistance [A] as follows.
○ Connect the hand tester between the coil terminals.
○ Set the tester to the x 1 Ω range, and read the tester.
● Measure the secondary winding resistance [B] as follows.
○ Remove the plug caps by turning them counterclockwise.

○Connect the tester between the spark plug leads.
○Set the tester to the x 1 kΩ range and read the tester.

Ignition Coil Winding Resistance

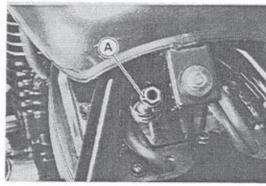
Primary Windings:	**2.3 ~ 3.5 Ω**
Secondary Windings:	**12.0 ~ 18.0 kΩ**

★If the tester does not read as specified, replace the coil.
○To install the plug cap, turn it clockwise.

Spark Plug Removal

●Remove:
Seat (see Frame chapter)
Spark Plug Caps
●Remove the spark plugs using the 16 mm plug wrench [A].

Owner's Tool – Spark Plug Wrench, 16 mm: 92110-1132



Spark Plug Installation

●Insert the spark plug vertically into the plug hole with the plug installed in the plug wrench.

Owner's Tool – Spark Plug Wrench, 16mm: 92110-1132

●Tighten the plugs.

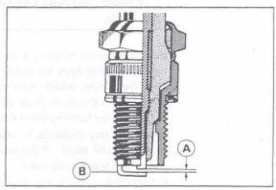
Torque – Spark Plugs: 18 N-m (1.8 kg-m, 13.0 ft-lb)

●Fit the plug caps securely.

Spark Plug Gap Inspection

●Measure the gap [A] with a wire-type thickness gauge.
★If the gaps are incorrect, carefully bend the side electrode [B] with a suitable tool to obtain the correct gaps.

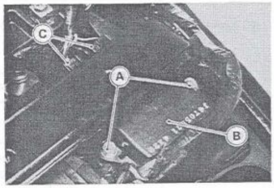
Spark Plug Gap
Standard: **0.7 ~ 0.8 mm**

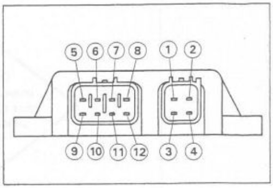


IC Igniter Inspection

CAUTION

When inspecting the IC igniter observe the following to avoid damage to the IC igniter.
Do not disconnect the IC igniter with the ignition switch on. This may damage the IC igniter.
Do not disconnect the battery leads while the engine is running. This may damage the IC igniter.





- Remove:
  Rear Fender (see Frame chapter)
  Bolts [A] and IC Igniter [B]
  Connectors [C]
- Set the hand tester to the x 1 kΩ range and make the measurements shown in the table.

Special Tool – Hand Tester: 57001-1394

★If the tester readings are not as specified, replace the IC igniter.

CAUTION

Use only Hand Tester 57001-1394 for this test. A tester other than the Kawasaki Hand Tester may show different readings.
If a megger or a meter with a large-capacity battery is used, the IC igniter will be damaged.

IC Igniter Internal Resistance (4P) **Unit: kΩ**

		Tester (+) Lead Connection			
	Terminal	1	2	3	4
(–)*	1	–	∞	∞	∞
	2	∞	–	0 ~ 1	30 ~ 150
	3	∞	0 ~ 1	–	30 ~ 150
	4	∞	28 ~ 150	28 ~ 150	–

(–)*: Tester (–) Lead Connection

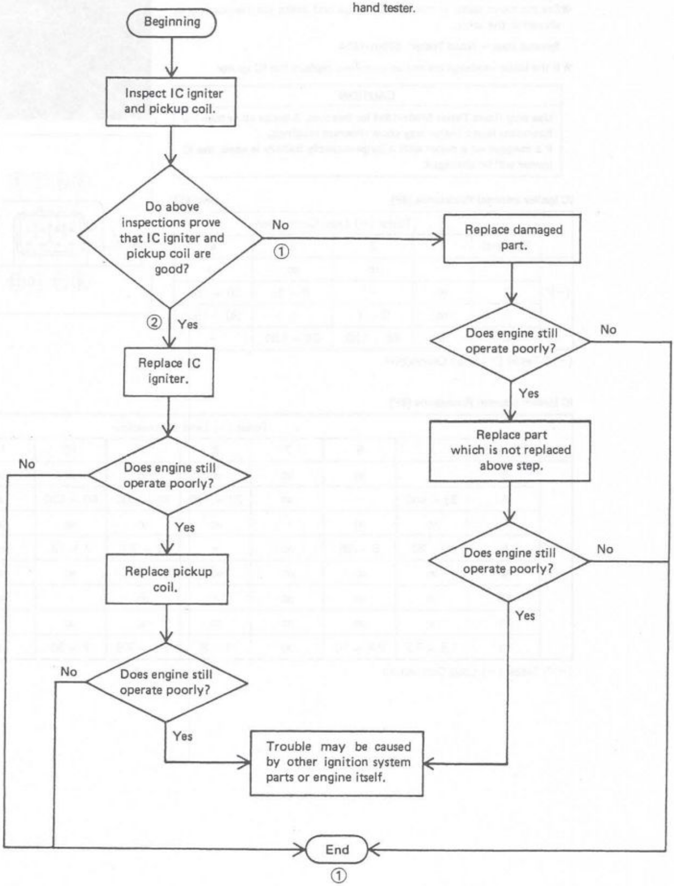
IC Igniter Internal Resistance (8P) **Unit: kΩ**

		Tester (+) Lead Connection							
	Terminal	5	6	7	8	9	10	11	12
(–)*	5	–	∞	∞	∞	∞	∞	∞	∞
	6	35 ~ 400	–	∞	22 ~ 100	35 ~ 400	50 ~ 500	∞	18 ~ 80
	7	∞	∞	–	∞	∞	∞	∞	∞
	8	5 ~ 20	6 ~ 26	∞	–	5 ~ 20	4 ~ 16	∞	2.2 ~ 9.5
	9	∞	∞	∞	∞	–	∞	∞	∞
	10	∞	∞	∞	∞	∞	–	∞	∞
	11	∞	∞	∞	∞	∞	∞	–	∞
	12	1.8 ~ 7.5	2.4 ~ 10	∞	2 ~ 8	1.8 ~ 7.5	7 ~ 30	∞	–

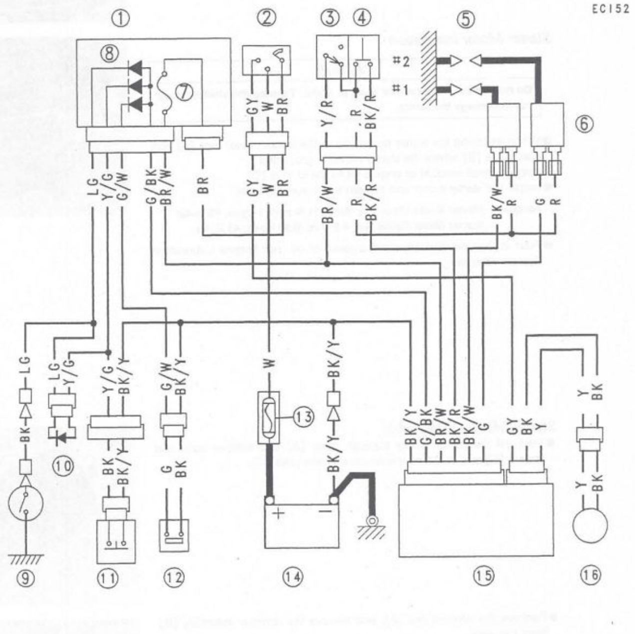
(–)*: Tester (–) Lead Connection

IC Igniter Troubleshooting

1) IC igniter or pickup coil damaged
2) Even if the preceding checks show good, it may be defective in some manner not readily detectable with the hand tester.



Ignition System Circuit

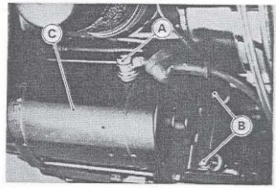


1. Junction Box
2. Ignition Switch
3. Engine Stop Switch
4. Starter Button
5. Spark Plugs
6. Ignition Coils
7. Ignition Fuse 10A
8. Diodes
9. Neutral Switch
10. Rectifier
11. Starter Lockout Switch
12. Side Stand Switch
13. Main Fuse 30A
14. Battery
15. IC Igniter
16. Pickup Coil

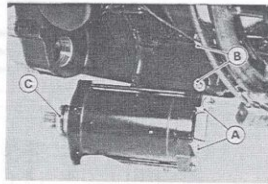
Electric Starter System

Starter Motor Removal

- Drain the engine oil (see Lubrication System chapter).
- Remove the starter motor cable nut [A] and the mounting bolts [B].
- Pull out the starter motor [C].



Starter Motor Installation



CAUTION

Do not tap the starter motor shaft or body. Tapping the shaft or body could damage the motor.

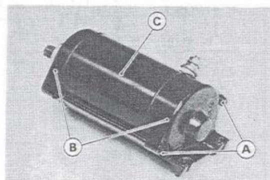
- When installing the starter motor, clean the starter motor legs [A] and crankcase [B] where the starter motor is grounded.
- Apply a small amount of engine oil to the O-ring [C].
- Install the starter motor and tighten the mounting bolts.

Torque – **Starter Motor Mounting Bolts: 11 N-m (1.1 kg-m, 95 in-lb)**
Starter Motor Cable Nut: 4.9 N-m (0.50 kg-m, 43 in-lb)

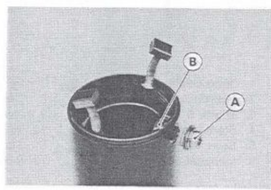
- Pour in the specified type and amount of oil (see Engine Lubrication System chapter).

Starter Motor Disassembly

- Take off the starter motor through bolts [A] and remove both end covers [B] and pull the armature out of the yoke [C].

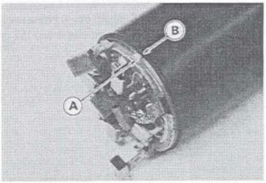


- Remove the terminal nut [A], and remove the terminal assembly [B] from the yoke.

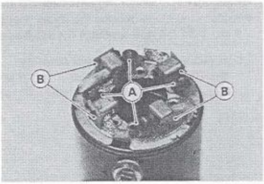


Starter Motor Assembly

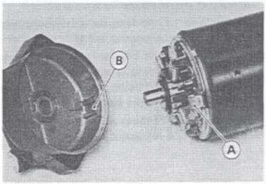
● Install the terminal assembly in the yoke.
● Tighten the terminal nut.
Torque – Starter Motor Terminal Nut: 11 N-m (1.1 kg-m, 95 in-lb)
● Fit the projection [A] of the brush plate into the yoke notch [B].



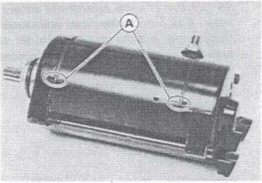
● After holding the springs [A] with suitable washers [B], insert the brushes as shown.
● Insert the armature, and then pull out the washers to release the springs.



● Fit the long tongue [A] of the bush plate into the end cover groove [B].



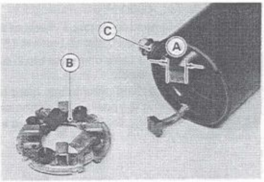
● When the yoke, brush plate, and end covers are properly assembled, the lines [A] on the yoke and cover should be aligned.
● Tighten the through bolts.
Torque – Starter Motor Through Bolts: 4.9 N-m (0.50 kg-m, 43 in-lb)



Brush Inspection

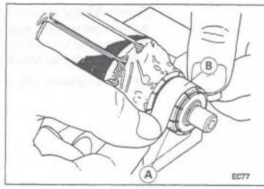
● Measure the length [A] of each brush.
★ If any is worn down to the service limit, replace the brush plate [B] and the terminal assembly [C].

Starter Motor Brush Length
Standard: 12.0 ~ 12.5 mm
Service Limit: 5.5 mm



Commutator Cleaning and Inspection

- Smooth the commutator surface [A] if necessary with fine emery cloth [B], and clean out the grooves.

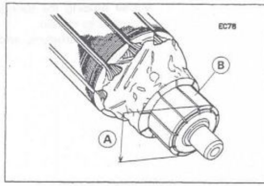


- Measure the diameter [A] of the commutator [B].

★Replace the starter motor with a new one if the commutator diameter is less than the service limit.

Commutator Diameter

Standard:	**28 mm**
Service Limit:	**27 mm**



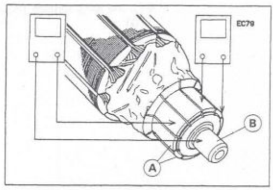
Armature Inspection

- Using the x 1 Ω hand tester range, measure the resistance between any two commutator segments [A].

★If there is a high resistance or no reading (∞) between any two segments, a winding is open and the starter motor must be replaced.

- Using the highest hand tester range, measure the resistance between the segments and the shaft [B].

★If there is any reading at all, the armature has a short and the starter motor must be replaced.



NOTE

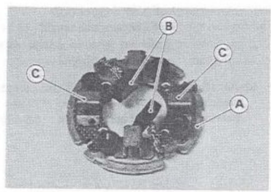
○*Even if the foregoing checks show the armature to be good, it may be defective in some manner not readily detectable with the hand tester. If all other starter motor and starter motor circuit components check good, but the starter motor still does not turn over or only turns over weakly, replace the starter motor with a new one.*

Brush Plate Inspection

- Using the x 1 Ω hand tester range, measure the resistance between the brush plate [A] and the negative brushes [B].

★If there is not close to zero ohms, the brush plate has an open. Replace the brush plate assembly.

- Using the highest hand tester range, measure the resistance between the brush plate and the positive brush holders [C].
- If there is any reading, the brush holder has a short. Replace the brush plate assembly.



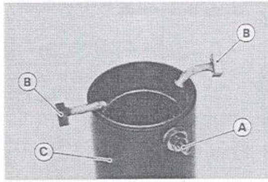
Terminal Inspection

● Using the × 1 Ω hand tester range, measure the resistance between the terminal [A] and the positive brushes [B].

★ If there is not close to zero ohms, the terminal assembly has an open. Replace the terminal assembly.

● Using the highest hand tester range, measure the resistance between the terminal and the yoke [C].

★ If there is any reading, the terminal assembly has a short. Replace the terminal assembly.



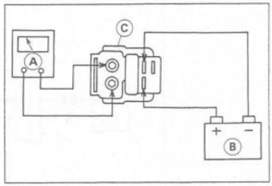
Starter Relay Inspection

● Remove the seat (see Frame chapter).

● Remove the starter relay.

● Connect the hand tester [A] and 12 V battery [B] to the starter relay [C] as shown.

★ If the relay does not work as specified, the relay is defective. Replace the relay.



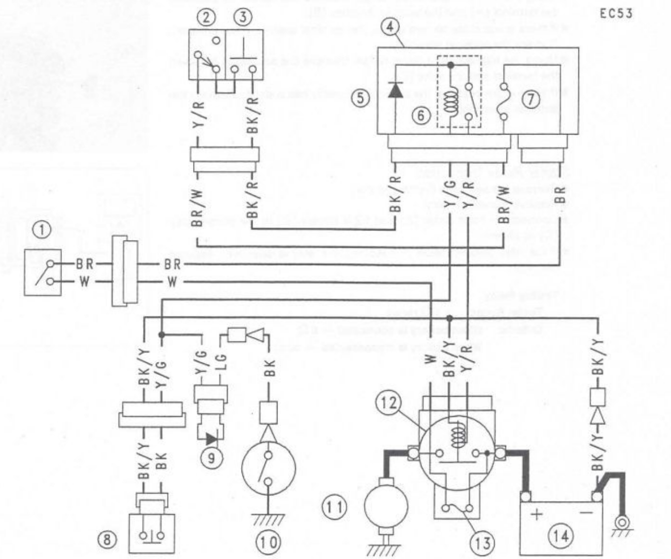
Testing Relay

Tester Range: x 1 Ω range

Criteria: When battery is connected → 0 Ω

When battery is disconnected → ∞ Ω

Electric Starter Circuit



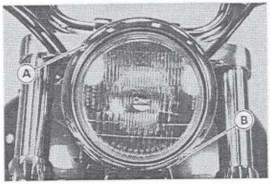
1. Ignition Switch
2. Engine Stop Switch
3. Starter Button
4. Junction Box
5. Diode
6. Starter Circuit Relay
7. Ignition Fuse 10A
8. Starter Lockout Switch
9. Rectifier
10. Neutral Switch
11. Starter Motor
12. Starter Relay
13. Main Fuse 30A
14. Battery

Lighting System

The US, Canada, and Australia models adopt the daylight system and have a headlight relay in the junction box. In these models, the headlight does not go on when the ignition switch and the engine stop switch are first turned on. The headlight comes on after the starter button is released and stays on until the ignition switch is turned off. The headlight will go out momentarily whenever the starter button is pressed and come back on when the button is released.

Headlight Beam Horizontal Adjustment

- Turn the horizontal adjuster [A] on the headlight in or out until the beam points straight ahead.



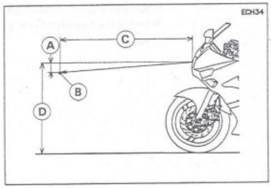
Headlight Beam Vertical Adjustment

- Turn the vertical adjuster [B] on the headlight in or out to adjust the headlight vertically.

NOTE

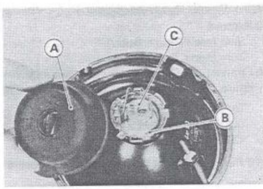
- *On high beam, the brightest points should be slightly below horizontal with the motorcycle on its wheels and the rider seated. Adjust the headlight(s) to the proper angle according to local regulations.*
- *For US model, the proper angle is 0.4 degrees below horizontal. This is 50 mm (2 in) drop at 7.6 m (25 ft) measured from the center of the headlights with the motorcycle on its wheels and the rider seated.*

50 mm (2 in) [A]
Center of Brightest Spot [B]
7.6 m (25 ft) [C]
Height of Headlight Center [D]



Headlight Bulb Replacement

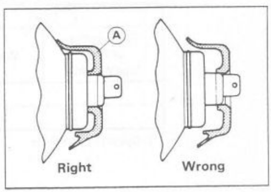
- Remove:
  Headlight Unit and Dust Cover [A]
  Hook [B]
- Replace the headlight bulb [C].



CAUTION

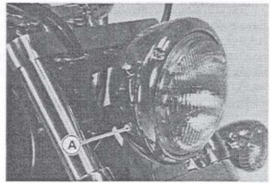
When handling the quartz-halogen bulb, never touch the glass portion with bare hands. Always use a clean cloth. Oil contamination from hands or dirty rags can reduce bulb life or cause the bulb to explode.

- Fit the dust cover [A] with the Top mark upward onto the bulb firmly as shown.
- After installation, adjust the headlight aim (see this chapter).

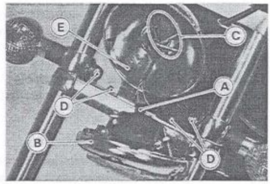


Headlight Unit, Housing Removal

● Remove:
  Screws [A] (both sides)

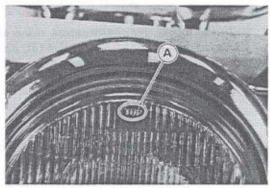


  Headlight Connector [A]
  Headlight Unit [B]
  Turn Signal Light Lead Connectors [C]
  Bolt and Nuts [D]
  Headlight Housing [E]



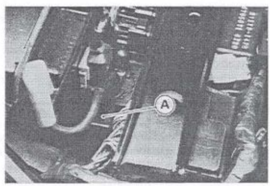
Headlight Unit Installation

● Install the headlight unit so that the "TOP" mark [A] on the lens points up.



Turn Signal Relay Inspection

● Remove:
  Seat (see Frame chapter)
  Turn Signal Relay [A]



● Connect one 12 V battery and turn signal lights as indicated in the figure, and count how may times the lights flash for one minute.

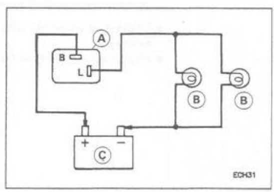
  Turn Signal Relay
  Turn Signal Lights [B]
  12 V Battery [C]

★ If the lights do not flash as specified, replace the turn signal relay.

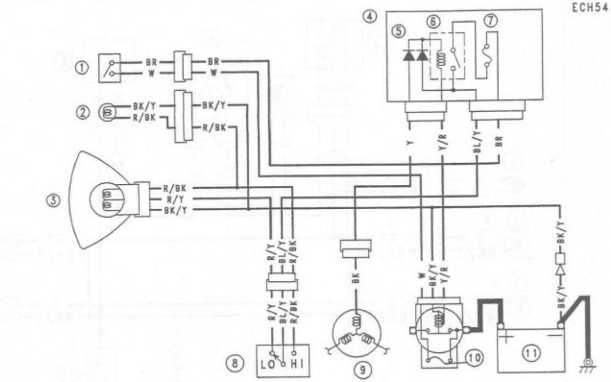
Testing Turn Signal Relay

Load		
The Number of Turn Signal Lights	Wattage(W)	Flashing times (c/m*)
1	21 or 23	Light stays on
2	42 or 46	75 ~ 95

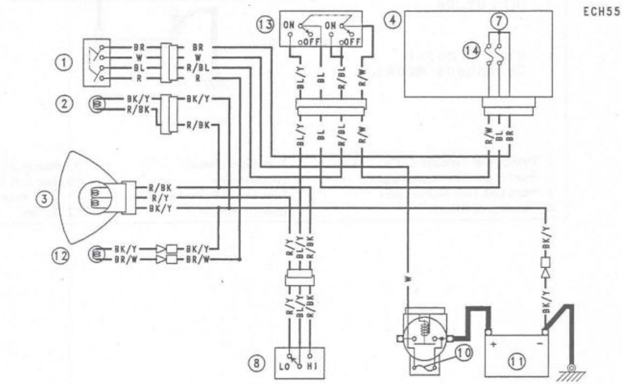
(*): Cycle(s) per minute



Headlight Circuit (U.S., Canada, and Australia)

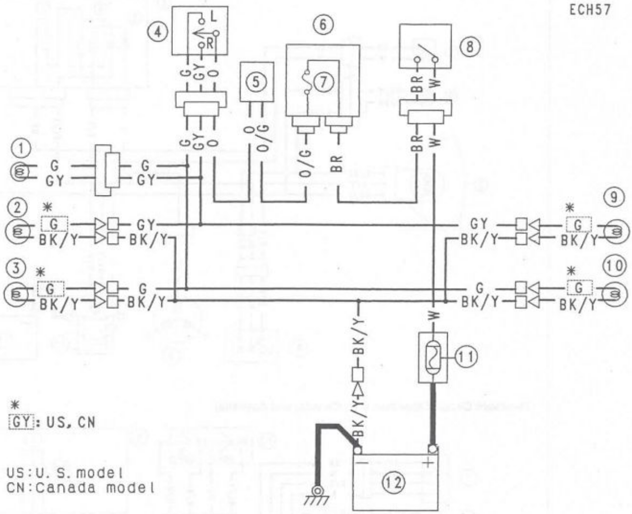


Headlight Circuit (Other than U.S., Canada, and Australia)



1. Ignition Switch
2. High Beam Indicator Light
3. Headlight
4. Junction Box
5. Diodes
6. Headlight Circuit Relay
7. Headlight Fuse 10A
8. Dimmer Switch
9. Alternator
10. Main Fuse 30A
11. Battery
12. City Light
13. Headlight Switch
14. Taillight Fuse 10A

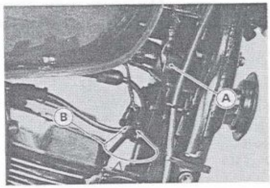
Turn Signal Light Circuit



1. Turn Signal Indicator Light
2. Front Right Turn Signal Light
3. Front Left Turn Signal Light
4. Turn Signal Switch
5. Turn Signal Relay.
6. Junction Box
7. Turn Signal Relay Fuse 10A
8. Ignition Switch
9. Rear Right Turn Signal Light
10. Rear Left Turn Signal Light
11. Main Fuse 30A
12. Battery

Radiator Fan System

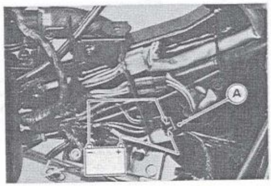
Fan System Circuit Inspection



- Turn on the ignition switch.
- Disconnect the leads from the radiator fan switch [A].
- Using an auxiliary wire [B], connect the radiator fan switch leads.

★If the fan rotates, inspect the fan switch.
★If the fan does not rotate, inspect the following.
Leads and Connectors
Main Fuse and Fan Fuse
Fan Motor

Fan Motor Inspection

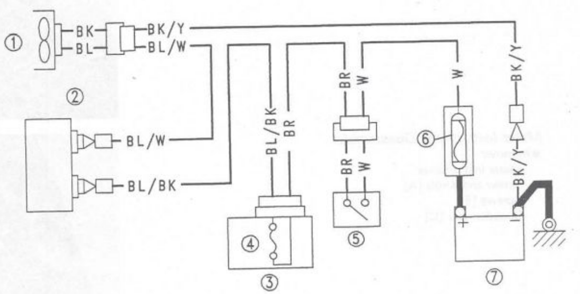


- Remove the Fuel Tank (see Fuel System chapter).
- Disconnect the 2-pin connector [A] in the fan motor leads.
- Using two auxiliary wires, supply battery power to the fan motor.

★If the fan does not rotate, the fan motor is defective and must be replaced.

Radiator Fan Circuit

ECH56

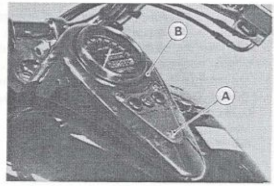


1. Radiator Fan
2. Radiator Fan Switch
3. Junction Box
4. Fan Fuse 10A
5. Ignition Switch
6. Main Fuse 30A
7. Battery

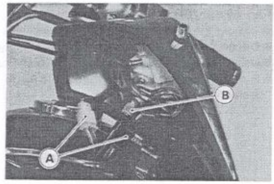
Meter Instruments

Meter Instruments Removal

● Remove the bolt [A], and separate the meter instruments [B] from the fuel tank.



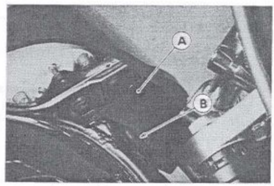
● Remove:
  Connectors [A]
  Speedometer Cable [B]



CAUTION
Place the meter so that the face is up. If a meter is left upside down or sideways for any length of time, it will malfunction.

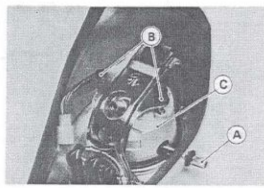
Meter Instruments Installation

● Insert the tongue [A] of the meter bracket into the damper slit [B] on the fuel tank.



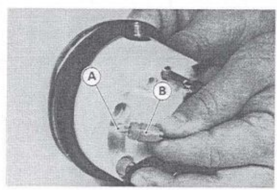
Meter Instruments Disassembly

● Remove:
  Meter Instruments
  Screw and Knob [A]
  Screws [B]
  Speedometer [C]



Bulb Replacement

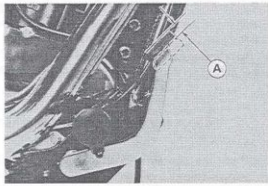
● To remove the wedge-base type bulb [A], pull the bulb out of the socket [B].



CAUTION
Do not turn the bulb. Pull the bulb out to prevent damage to the bulb. Do not use bulb rated for greater wattage than the specified value.

Switches and Sensor

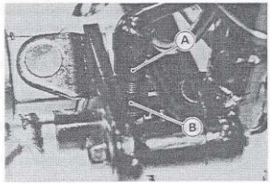
Brake Light Timing Inspection



●Turn on the ignition switch.
●Check the operation of the rear brake light switch by depressing the brake pedal.
★If it does not as specified, adjust the brake light timing.

Brake Light Timing
Standard: On after about 15 mm pedal travel [A]

Brake Light Timing Adjustment



Brake light timing is adjusted by changing the position of the rear brake light switch [A].
●Adjust the position of the switch so that the brake light goes on after the specified pedal travel by turning the adjusting nut [B].

CAUTION
To avoid damaging the electrical connections inside the switch, be sure that the switch body does not turn during adjustment.

Switch Inspection

●Using the hand tester, check to see that only the connections shown in the table have continuity (about zero ohms).
○For the handlebar switches and the ignition switch, refer to the tables in the Wiring Diagram.
★If the switch has an open or short, repair it or replace it with a new one.

Special Tool – Hand Tester: 57001-1394

Rear Brake Light Switch Connections

	BR	BL
When brake pedal is pushed down	○	○
When brake pedal is released		

Side Stand Switch Connections

	G	BK/Y
When side stand is up	○	○
When side stand is down		

Neutral Switch Connections

	SW. Terminal	⏚
When transmission is in neutral	○	○
When transmission is not in neutral		

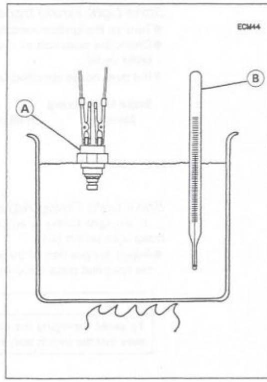
Oil Pressure Switch Connections*

	SW. Terminal	⏚
When engine is stopped	○	○
When engine is running		

*: Engine lubrication system is in good condition

Radiator Fan Switch Inspection

- Remove the fan switch (see Cooling System chapter).
- Suspend the switch [A] in a container of coolant so that the temperature-sensing projection and threaded portion are submerged.
- Suspend an accurate thermometer [B] in the coolant.



NOTE

○ *The switch and thermometer must not touch the container sides or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using the hand tester, measure the internal resistance of the switch across the terminals at the temperatures shown in the table.

★If the hand tester does not show the specified values, replace the switch.

Radiator Fan Switch Resistance

○**Rising temperature:**

From OFF to ON at 93 ~ 103°C (199 ~ 217°F)

○**Falling temperature:**

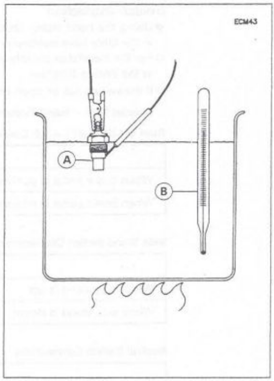
From ON to OFF at above 91 ~ 95°C (196 ~ 203°F)

ON: Less than 0.5 Ω

OFF: More than 1 MΩ

Water Temperature Sensor Inspection

- Remove the water temperature sensor (see Cooling System chapter).
- Suspend the sensor [A] in a container of coolant so that the temperature-sensing projection and threaded portion are submerged.
- Suspend an accurate thermometer [B] in the coolant.



NOTE

○ *The sensor and thermometer must not touch the container side or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using the hand tester, measure the internal resistance of the sensor across the terminal and the body at the temperatures shown in the table.

★If the hand tester does not show the specified values, replace the sensor.

Water Temperature Sensor Resistance

○**Rising temperature:**

From OFF to ON at 113 ~ 117°C (235 ~ 243°F)

○**Falling temperature:**

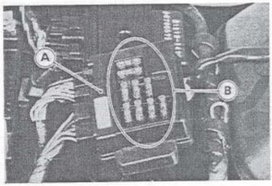
From ON to OFF at below 108°C (226°F)

ON: Less than 0.5 Ω

OFF: More than 1 MΩ

Junction Box

The junction box [A] has fuses [B], relays, and diodes. The relays and diodes can not be removed.



Junction Box Fuse Circuit Inspection

- ●Remove the seat (see Frame chapter).
- ●Remove the junction box.
- ●Pull off the connectors from the junction box.
- ●Make sure all connector terminals are clean and tight, and none of them have been bent.
- ★Clean the dirty terminals, and straighten slightly-bent terminals.
- ●Check conductivity of the numbered terminals with the hand tester.
- ★If the tester does not read as specified, replace the junction box.

Fuse Circuit Inspection

Tester Connection	Tester Reading (Ω)
1 – 1A	0
1 – 2	0
3A – 4	0
6 – 5	0
6 – 10	0
6 – 7	0
6 – 17	0

Tester Connection	Tester Reading (Ω)
1A – 8	∞
2 – 8	∞
3A – 8	∞
6 – 2	∞
6 – 3A	∞
17 – 3A	∞

Starter Circuit/Headlight Relay Inspection

- ●Remove the junction box.
- ●Check conductivity of the following numbered terminals by connecting the hand tester and one 12 V battery to the junction box as shown.
- ★If the tester does not read as specified, replace the junction box.

Relay Circuit Inspection (with the battery disconnected)

	Tester Connection	Tester Reading (Ω)
Headlight Relay	*7 – 8	∞
	*7 – 13	∞
	(+) (–) *13 – 9	Not ∞ **

	Tester Connection	Tester Reading (Ω)
Starter Circuit Relay	9 – 11	∞
	12 – 13	∞
	(+) (–) 13 – 11	∞
	(+) (–) 12 – 11	Not ∞ **

(*): US, Canada, and Australia Models only
(**): The actual reading varies with the hand tester used.
(+): Apply tester positive lead.
(–): Apply tester negative lead.

Relay Circuit Inspection (with the battery connected)

	Battery Connection (+) (−)	Tester Connection	Tester Reading (Ω)
Headlight Relay	*9 − 13	*7 − 8	0
Starter Circuit Relay	11 − 12	(+) (−) 13 − 11	Not ∞ **

(*): US, Canada, and Australia Models only
(**): The actual reading varies with the hand tester used.
(+): Apply tester positive lead.
(−): Apply tester negative lead.

Diode Circuit Inspection

● Remove the junction box.
● Check conductivity of the following pairs of terminals.

Diode Circuit Inspection

Tester Connection	*13-8, *13-9, 12-11, 12-14, 15-14, 16-14

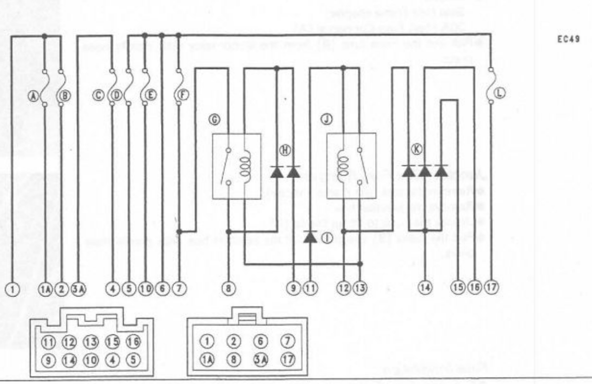
*: US, Canada, and Australia Models only

★The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the junction box must be replaced.

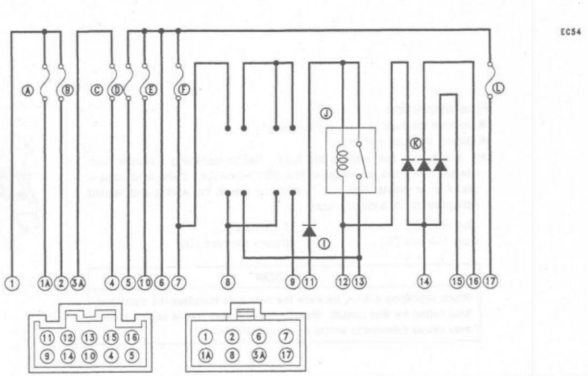
NOTE

○*The actual meter reading varies with the meter used and the individual diodes, but, generally speaking, the lower reading should be from zero to one half the scale.*

Junction Box Internal Circuit (US, Canada, and Australia)



Junction Box Internal Circuit (Other than US, Canada, and Australia)

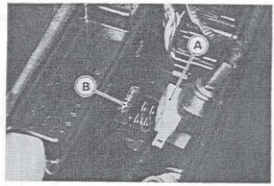


A. Accessory Fuse 10A
B. Fan Fuse 10A
C. Turn Signal Relay Fuse 10A
D. Horn Fuse 10A
E. Ignition Fuse 10A
F. Headlight Fuse 10A
G. Headlight Relay
H. Headlight Diodes
I. Starter Diode
J. Starter Circuit Relay
K. Interlock Diodes
L. Taillight Fuse 10A

Fuses

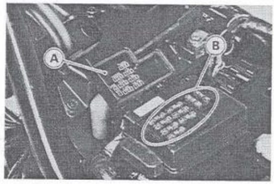
30A Main Fuse Removal

- Remove:
  Seat (see Frame chapter)
  30A Main Fuse Connector [A]
- Pull out the main fuse [B] from the starter relay with needle nose pliers.



Junction Box Fuse Removal

- Remove the seat (see Frame chapter).
- Remove the junction box.
- Unlock the hook to lift up the lid [A].
- Pull the fuses [B] straight out of the junction box with needle nose pliers.



Fuse Installation

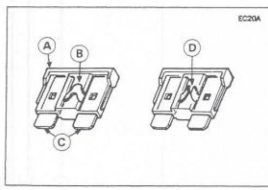
- If a fuse fails during operation, inspect the electrical system to determine the cause, and then replace it with a new fuse of proper amperage.
- Install the junction box fuses on the original position as specified on the lid.

Fuse Inspection

- Remove the fuse (see Fuse Removal).
- Inspect the fuse element.

★If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

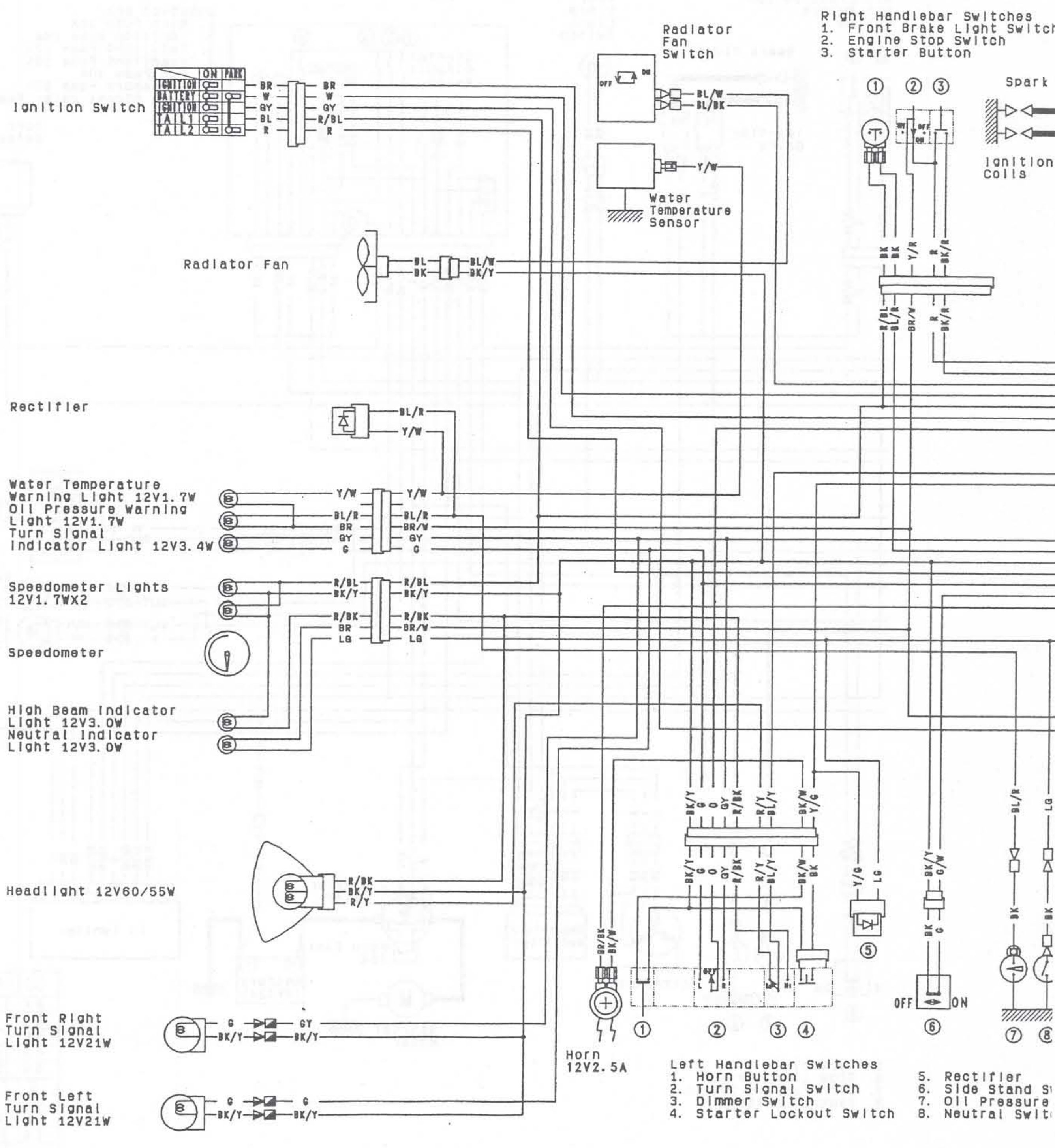
Housing [A]
Fuse Element [B]
Terminals [C]
Blown Element [D]



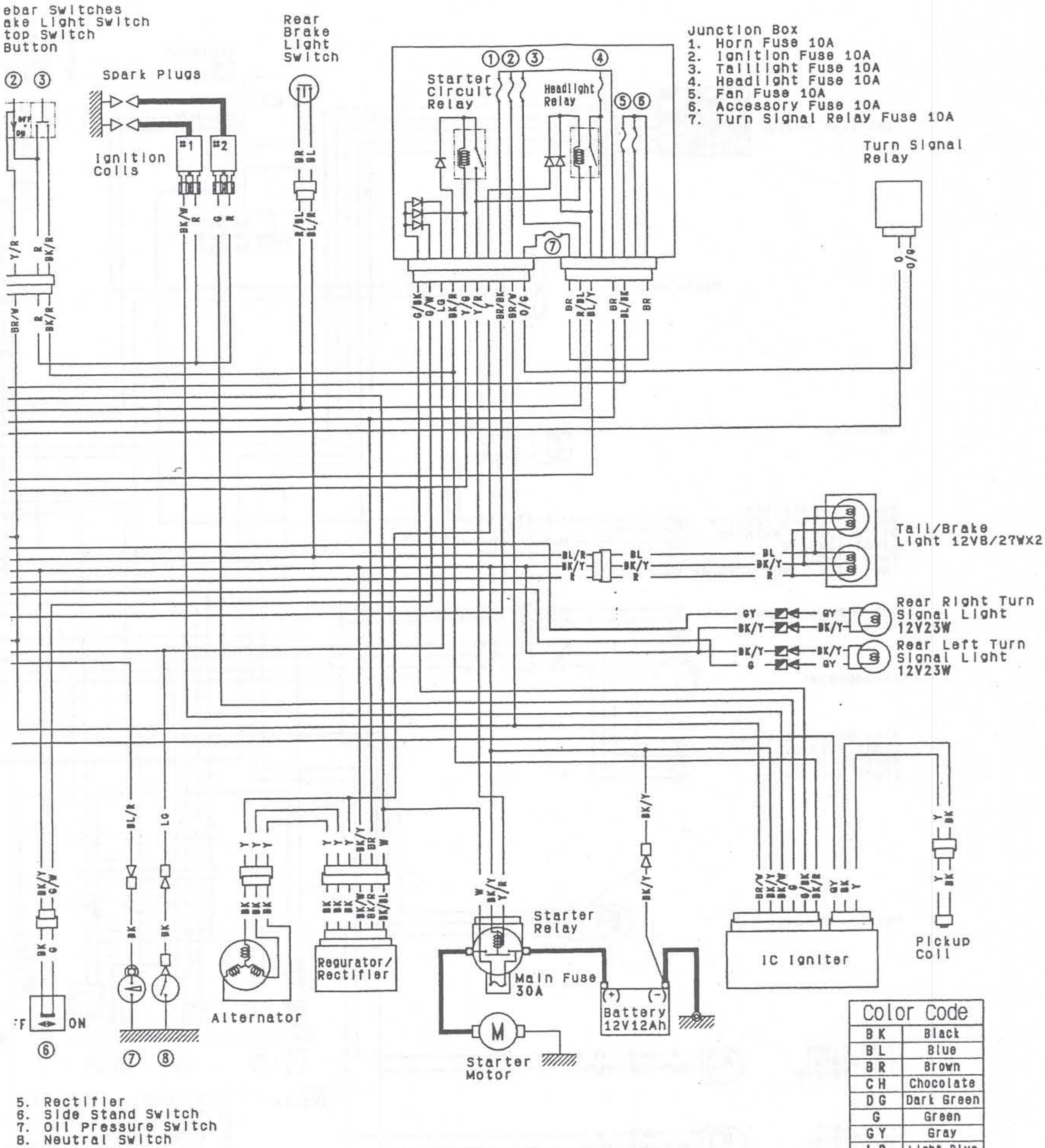
CAUTION

When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.

Wiring Diagram (Australia)



LEFT HANDLEBAR SWITCH CONNECTIONS													
Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switc		
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	Bl
			L	○—	—○		HI		○—	—○	Clutch Lever		
Push	○—	—○	OFF(Push)								Released		
			R		○—	—○	LO	○—	—○		Pulled In	○—	—○



Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

ONNECTIONS

Starter Lockout Switch		
Color	BK/Y	BK
Clutch Lever		
Released		
Pulled In	O—	—O

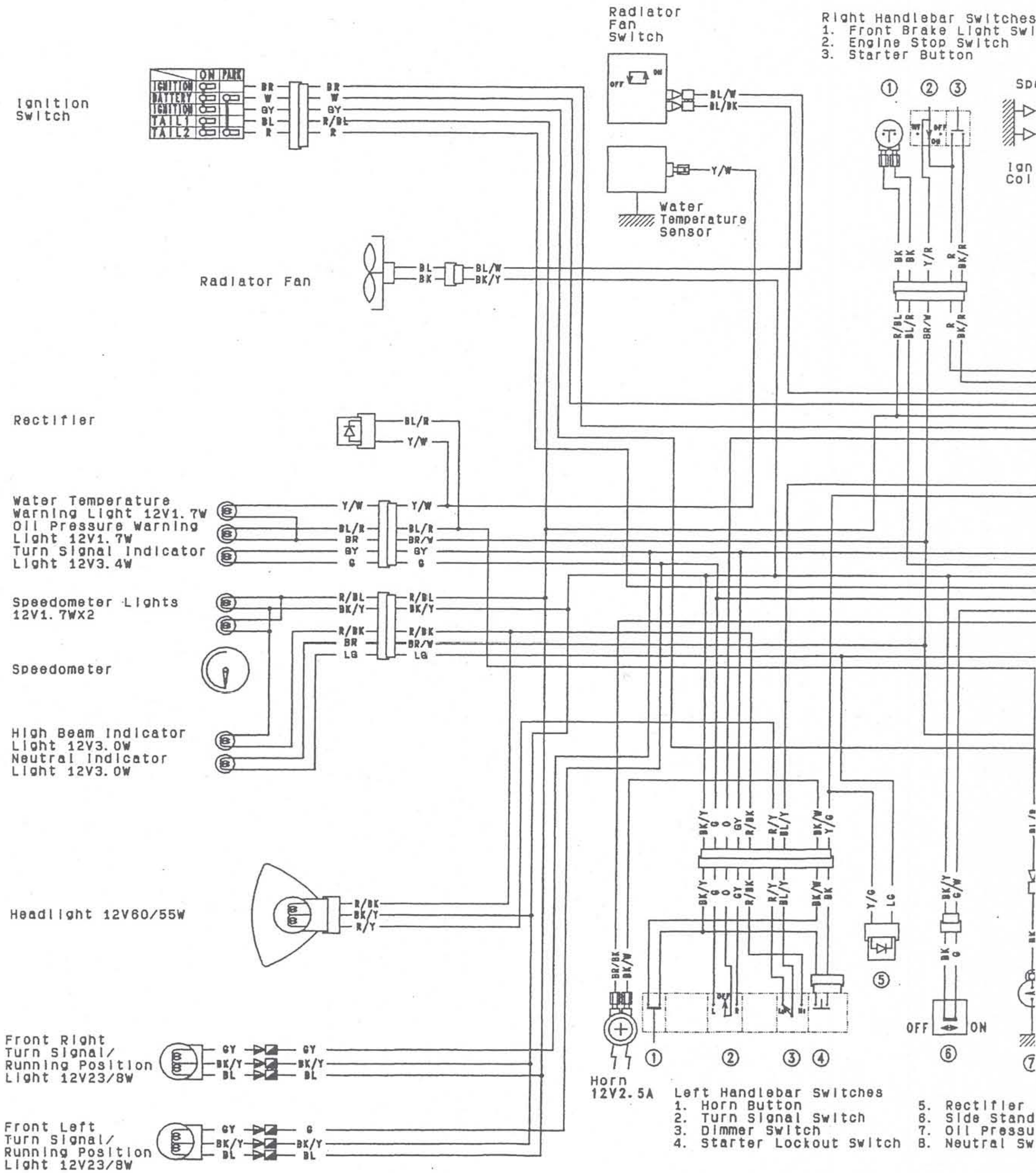
IGNITION SWITCH CONNECTIONS

	Ignition	Battery	Ignition	Tail1	Tail2
Color	BR	W	GY	BL	R
OFF, LOCK					
ON	O—	—O—	—O	O—	—O
P		O—	—	—	—O

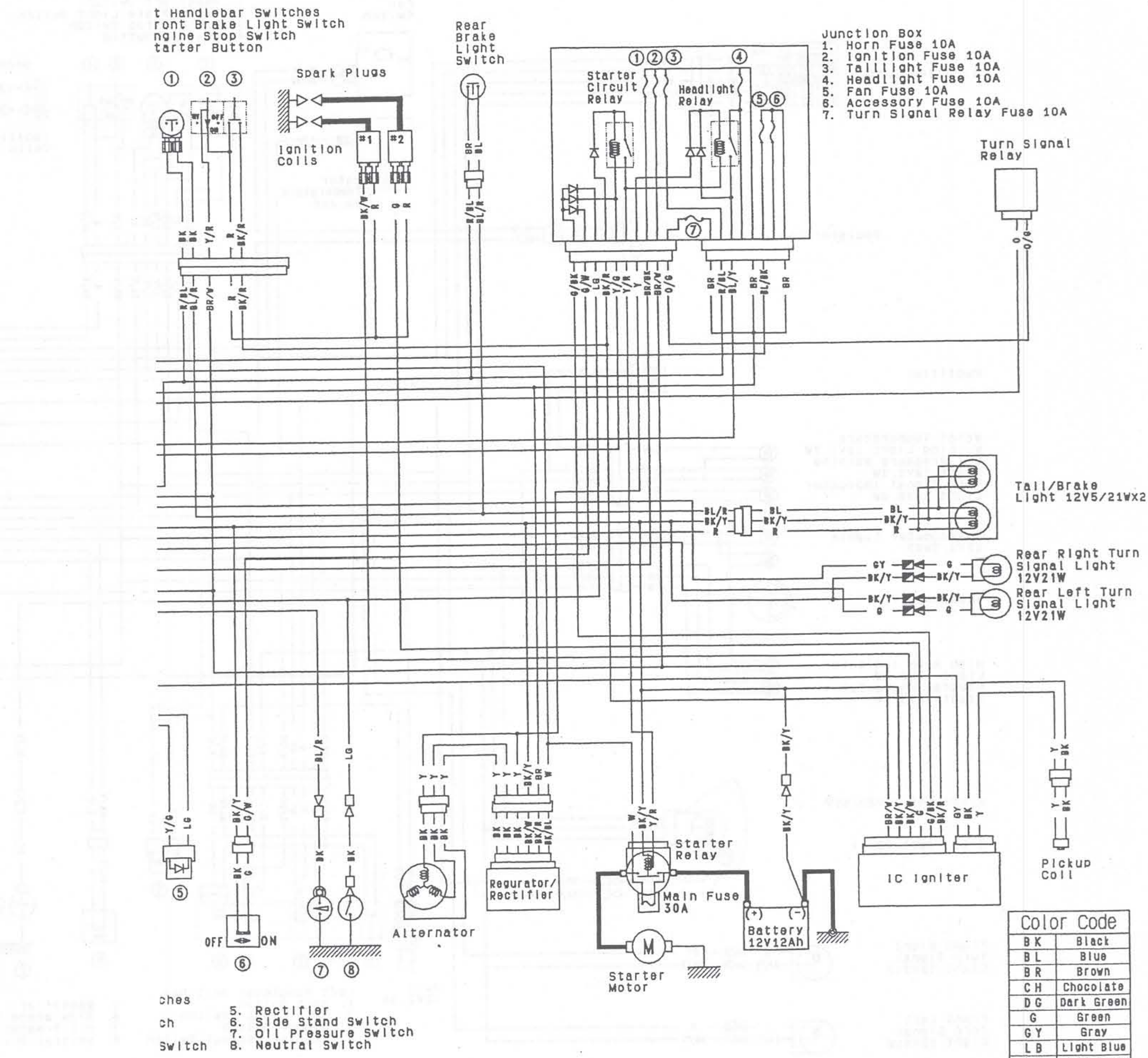
RIGHT HANDLEBAR SWITCH CONNECTIONS

Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	R	BK/R
Brake Lever			OFF					
Pulled In	O—	—O	RUN	O—	—O	Push	O—	—O

(98051-1534C)C



LEFT HANDLEBAR SWITCH CONNECTIONS													
Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switc		
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK
			L	○	○		HI		○	○	Clutch Lever		
Push	○	○	OFF(Push)								Released		
			R		○	○	LO	○	○		Pulled In	○	○



ches
ch
Switch

5. Rectifier
6. Side Stand Switch
7. Oil Pressure Switch
8. Neutral Switch

			Starter Lockout Switch		
R/Y	BL/Y	R/BK	Color	BK/Y	BK
	●	●	Clutch Lever		
			Released		
●	●		Pulled in	●	●

(CONNECTIONS / er Switch)

IGNITION SWITCH CONNECTIONS

	Ignition	Battery	Ignition	Tail1	Tail2
Color	BR	W	GY	BL	R
OFF, LOCK					
ON	●	●	●	●	●
P (PARK)		●	●	●	●

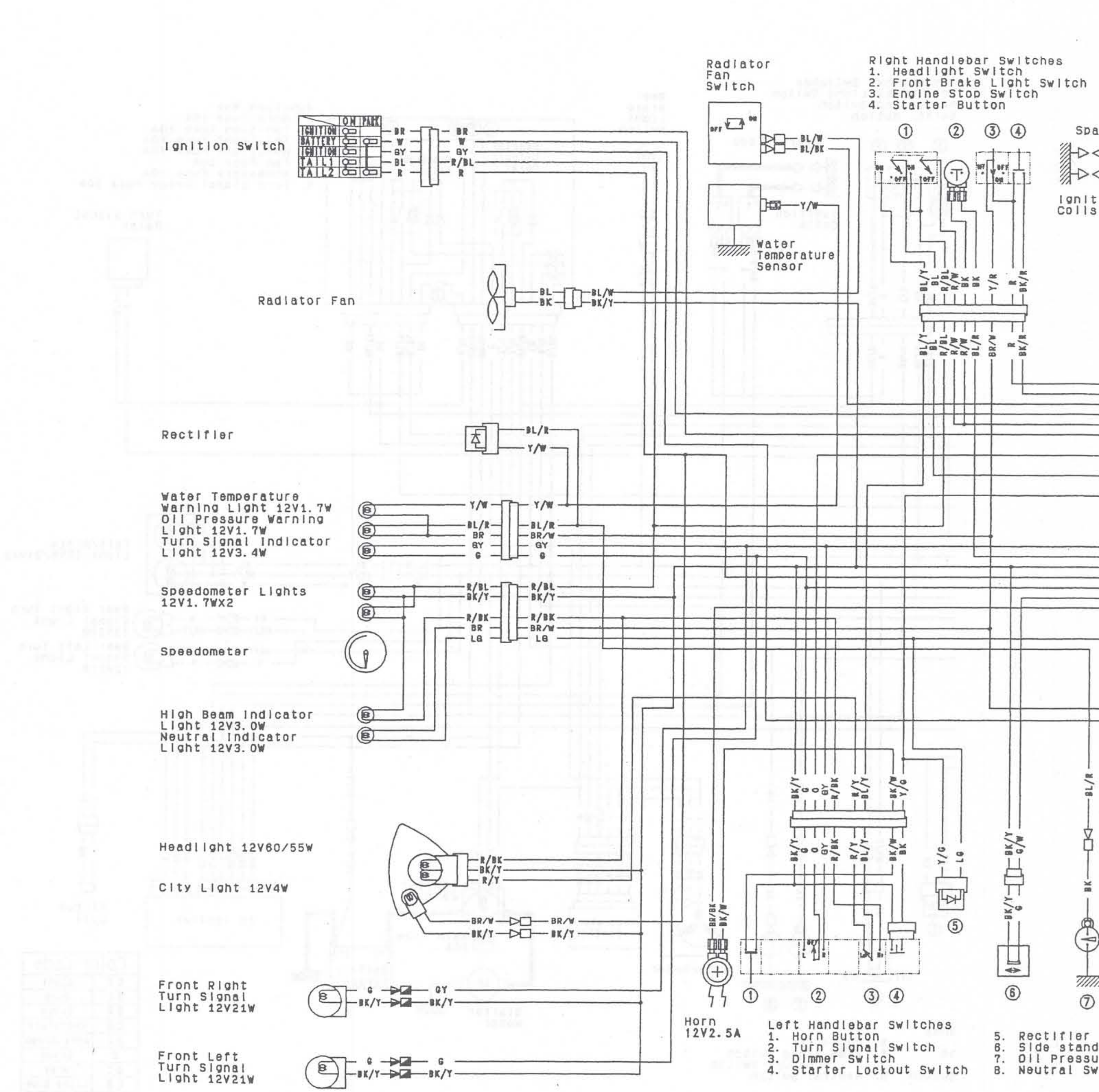
RIGHT HANDLEBAR SWITCH CONNECTIONS

Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	R	BK/R
Brake Lever			OFF					
Pulled In	●	●	RUN	●	●	Push	●	●

(98051-1554B)

Color Code

BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow



LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button		
Color	BK/W	BK/Y
Push	○—	—○
Released		

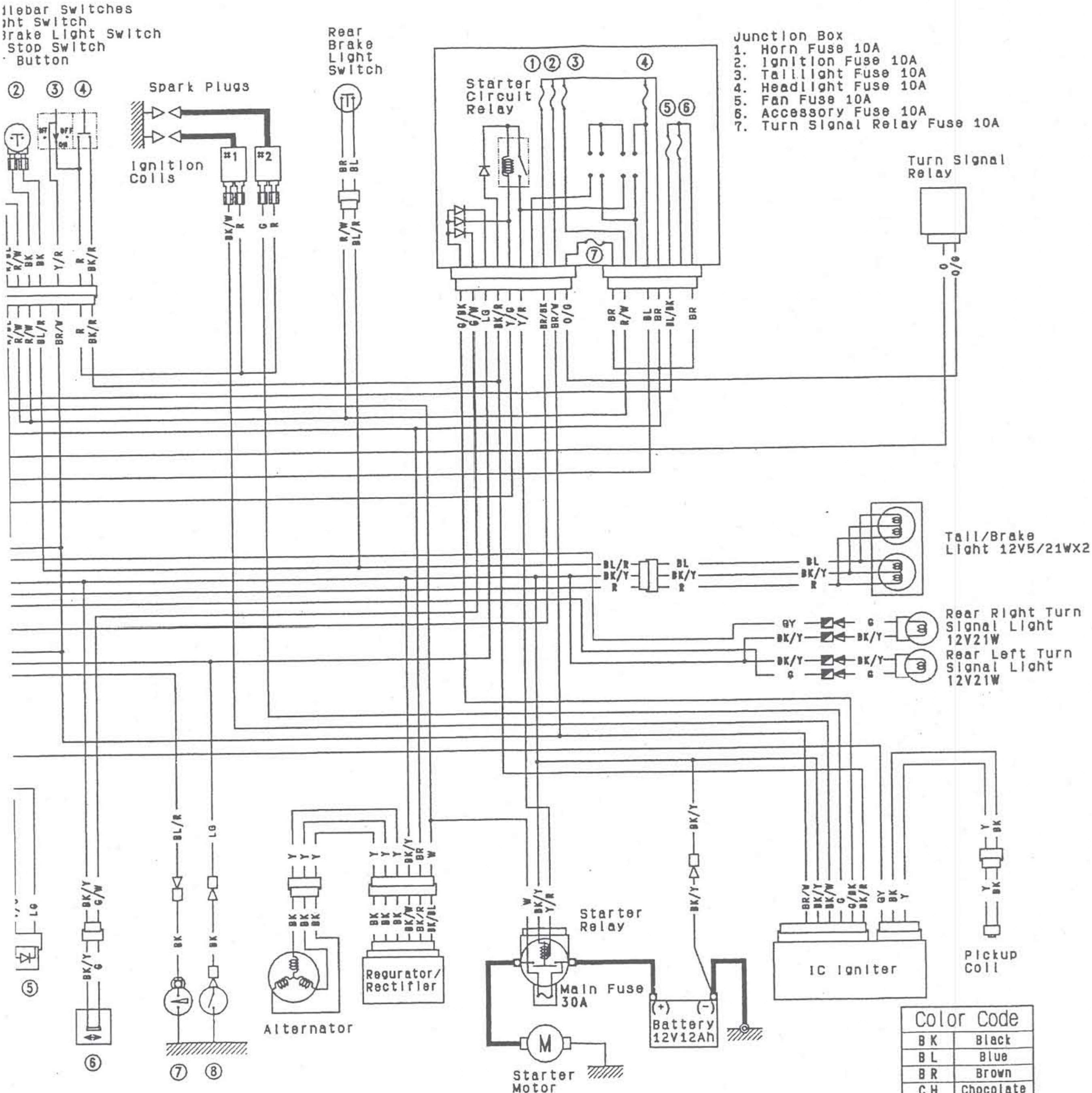
Turn Signal Switch			
Color	G	O	GY
R		○—	—○
OFF(Push)			
L	○—	—○	

Dimmer Switch			
Color	R/Y	BL/Y	R/BK
LO	○—	—○	
HI		○—	—○

Starter Lockout Switch		
Color	BK/Y	BK
Clutch Lever		
Released		
Pulled In	○—	—○

IGNITION SWITC

	Ignition	Battery
Color	BR	W
ON	○—	—○—
P(PARK)		○—



Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

(98051-1541C)

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5. Rectifier
6. Side stand Switch
7. Oil Pressure Switch
tch 8. Neutral Switch

tch	
K	
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IGNITION SWITCH CONNECTIONS

	Ignition	Battery	Ignition	Tail1	Tail2
Color	BR	W	GY	BL	R
ON	○	○	○	○	○
P(PARK)		○			○

RIGHT HANDLEBAR SWITCH CONNECTIONS

Headlight Switch

Color	R/BL	R/W	BL/Y	BL
OFF				
●	○	○		
ON	○	○	○	○

Front Brake Light Switch

Color	BK	BK
Brake Lever		
Pulled in	○	○
Released		

Engine Stop Switch

Color	R	Y/R
OFF		
RUN	○	○

Starter Button

Color	R	BK/R
Push	○	○
Released		

Appendix

Table of Contents

Additional Considerations for Racing

This motorcycle has been manufactured for use in a reasonable and prudent manner and as a vehicle only. However, some may wish to subject this motorcycle to abnormal operation, such as would be experienced under racing conditions. KAWASAKI STRONGLY RECOMMENDS THAT ALL RIDERS RIDE SAFELY AND OBEY ALL LAWS AND REGULATIONS CONCERNING THEIR MOTORCYCLE AND ITS OPERATION.

Racing should be done under supervised conditions, and recognized sanctioning bodies should be contacted for further details. For those who desire to participate in competitive racing or related use, the following technical information may prove useful. However, please note the following important notes.

- You are entirely responsible for the use of your motorcycle under abnormal conditions such as racing, and Kawasaki shall not be liable for any damages which might arise from such use.
- Kawasaki's Limited Motorcycle Warranty and Limited Emission Control Systems Warranty specifically exclude motorcycles which are used in competition or related uses. Please read the warranty carefully.
- Motorcycle racing is a very sophisticated sport, subject to many variables. The following information is theoretical only, and Kawasaki shall not be liable for any damages which might arise from alterations utilizing this information.
- When the motorcycle is operated on public roads, it **must** be in its original state in order to ensure safety and compliance with applicable regulations.

Carburetor:

Sometimes an alteration may be desirable for improved performance under special conditions when proper mixture is not obtained after the carburetor has been properly adjusted, and all parts cleaned and found to be functioning properly.

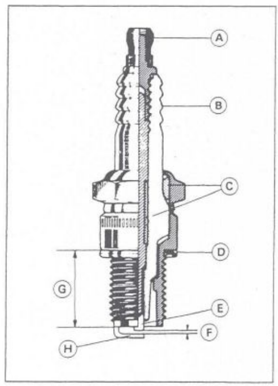
If the engine still exhibits symptoms of overly rich or lean carburetion after all maintenance and adjustments are correctly performed, the main jet can be replaced with a smaller or larger one. A smaller numbered jet gives a leaner mixture and a larger numbered jet a richer mixture.

Spark Plug:

The spark plug ignites the fuel and air mixture in the combustion chamber. To do this effectively and at the proper time, the correct spark plug must be used, and the spark plug must be kept clean and the gap adjusted.

Tests have shown the plug listed in the "General Information" chapter to be the best plug for general use.

Since spark plug requirements change with the ignition and carburetion adjustments and with riding conditions, whether or not a spark plug of the correct heat range is used should be determined by removing and inspecting the plug.



A. Terminal
B. Insulator
C. Cement
D. Gasket
E. Center Electrode
F. Gap (0.7 ~ 0.8 mm)
G. Reach
H. Side Electrode

When a plug of the correct heat range is being used, the electrodes will stay hot enough to keep all the carbon burned off, but cool enough to keep from damaging the engine and the plug itself. This temperature is about 400 ~ 800°C (750 ~ 1,450°F) and can be judged by noting the condition and color of the ceramic insulator around the center electrode. If the ceramic is clean and of a light brown color, the plug is operating at the right temperature.

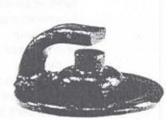
A spark plug for higher operating temperatures is used for racing. Such a plug is designed for better cooling efficiency so that it will not overheat and thus is often called a "colder" plug. If a spark plug with too cool a heat range is used – that is, a "cold" plug that cools itself too well – the plug will stay too cool to burn off the carbon, and the carbon will collect on the electrodes and the ceramic insulator.

The carbon on the electrodes conducts electricity, and can short the center electrode to ground by either coating the ceramic insulator or bridging across the gap. Such a short will prevent an effective spark. Carbon build-up on the plug can also cause other troubles. It can heat up red-hot and cause preignition and knocking, which may eventually burn a hole in the top of the piston.

Spark Plug Condition



Carbon fouling



Oil fouling



Normal operation



Overheating

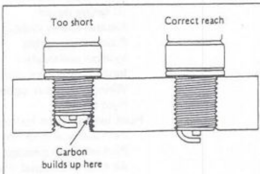
Spark Plug Inspection

● Remove the spark plug and inspect the ceramic insulator.

★ Whether or not the right temperature plug is being used can be ascertained by noting the condition of the ceramic insulator around the electrode. A light brown color indicates the correct plug is being used. If the ceramic is black, it indicates that the plug is firing at too low a temperature, so the next hotter type should be used instead. If the ceramic is white, the plug is operating at too high a temperature and it should be replaced with the next colder type.

CAUTION

If the spark plug is replaced with a type other than the standard plug, make certain the replacement plug has the same thread pitch and reach (length of threaded portion) and the same type electrode (regular type or projected type) as the standard plug.
If the plug reach is too short, carbon will build up on the plug hole threads in the cylinder head, causing overheating and making it very difficult to insert the correct spark plug later.
If the reach is too long, carbon will build up on the exposed spark plug threads causing overheating, preigniton, and possibly burning a hole in the piston top. In addition, it may be impossible to remove the plug without damaging the cylinder head.



Standard Spark Plug Threads

Diameter:	**10 mm**
Pitch:	**1.0 mm**
Reach:	**19 mm**

NOTE

○ *The heat range of the spark plug functions like a thermostat for the engine. Using the wrong type of spark plug can make the engine run too hot (resulting in engine damage) or too cold (with poor performance, misfiring, and stalling).*

Troubleshooting Guide

NOTE

○ *This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.*

Engine Doesn't Start, Starting Difficulty:

Starter motor not rotating:
- Starter lockout or neutral switch trouble
- Starter motor trouble
- Battery voltage low
- Starter relays not contacting or operating
- Starter button not contacting
- Wiring open or shorted
- Ignition switch trouble
- Engine stop switch trouble
- Fuse blown

Starter motor rotating but engine doesn't turn over:
- Starter clutch trouble
- Torque limiter trouble

Engine won't turn over:
- Valve seizure
- Rocker arm seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Camshaft seizure
- Balancer bearing seizure

No fuel flow:
- No fuel in tank
- Fuel tap vacuum hose clogged
- Fuel tank air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded:
- Fuel level in carburetor float bowl too high
- Float valve worn or stuck open
- Starting technique faulty
- (When flooded, crank the engine with the throttle fully opened to allow more air to reach the engine.)

No spark; spark weak:
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Neutral, starter lockout, or side stand switch trouble
- Pickup coil trouble
- Ignition coil trouble
- Ignition or engine stop switch shorted
- Wiring shorted or open
- Fuse blown

Fuel/air mixture incorrect:
- Pilot screw and/or idle adjusting screw maladjusted
- Pilot jet, or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter jet clogged

Compression Low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/groove clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Poor Running at Low Speed:

Spark weak:
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Pickup coil trouble
- Ignition coil trouble

Fuel/air mixture incorrect:
- Pilot screw maladjusted
- Pilot jet, or air passage clogged
- Air bleed pipe bleed holes clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter plunger stuck open
- Fuel level in carburetor float bowl too high or too low
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air cleaner duct loose
- Air cleaner O-ring damaged

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/groove clearance excessive
- Cylinder head warped
- Cylinder head gasket damaged
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Other:
- IC igniter trouble
- Carburetor vacuum piston doesn't slide smoothly
- Carburetor vacuum piston diaphragm damage
- Engine oil viscosity too high
- Drive train trouble
- Brake dragging
- Air suction valve trouble
- Vacuum switch valve trouble
- Coasting enricher trouble

Poor Running or No Power at High Speed:

Firing incorrect:
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Pickup coil trouble
- Ignition coil trouble

Fuel/air mixture incorrect:
- Starter plunger stuck open
- Main jet clogged or wrong size
- Jet needle or needle jet worn
- Air jet clogged
- Fuel level in carburetor float bowl too high or too low
- Bleed holes of needle jet holder or needle jet clogged
- Air cleaner clogged, poorly sealed, or missing
- Air cleaner duct loose
- Air cleaner O-ring damaged
- Water or foreign matter in fuel
- Carburetor holder loose
- Fuel tank air vent obstructed
- Fuel tap clogged
- Fuel line clogged

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/groove clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface.)

Knocking:
- Carbon built up in combustion chamber
- Fuel poor quality or incorrect
- Spark plug incorrect
- IC igniter trouble

Miscellaneous:
- Throttle valve won't fully open
- Carburetor vacuum piston doesn't slide smoothly
- Carburetor vacuum piston diaphragm damaged
- Brake dragging
- Clutch slipping
- Overheating
- Engine oil level too high
- Engine oil viscosity too high
- Drive train trouble
- Air suction valve trouble
- Vacuum switch valve trouble
- Coasting enricher trouble
- Balancer mechanism malfunctioning

Overheating:

Firing incorrect:
- Spark plug dirty, broken, or maladjusted
- Spark plug incorrect
- IC igniter trouble

Fuel/air mixture incorrect:
- Main jet clogged or wrong size
- Fuel level in carburetor float bowl too low
- Carburetor holder loose
- Air cleaner duct loose
- Air cleaner poorly sealed, or missing
- Air cleaner O-ring damaged
- Air cleaner clogged

Compression high:
- Carbon built up in combustion chamber

Engine load faulty:
- Clutch slipping
- Engine oil level too high
- Engine oil viscosity too high
- Drive train trouble
- Brake dragging

Lubrication inadequate:
- Engine oil level too low
- Engine oil poor quality or incorrect

Coolant incorrect:
- Coolant level too low
- Coolant deteriorated

Cooling system component incorrect:
- Radiator fin damaged
- Radiator clogged
- Thermostat trouble
- Radiator cap trouble
- Radiator fan switch trouble
- Fan motor broken
- Fan blade damaged
- Water pump not turning
- Water pump impeller damaged

Over Cooling:

Cooling system component incorrect:
- Radiator fan switch trouble
- Thermostat trouble

Clutch Operation Faulty:

Clutch slipping:
- Friction plate worn or warped
- Steel plate worn or warped
- Clutch spring broken or weak
- Clutch hub or housing unevenly worn
- No clutch lever play
- Clutch inner cable catching
- Clutch release mechanism trouble

Clutch not disengaging properly:
- Clutch plate warped or too rough
- Clutch spring compression uneven
- Engine oil deteriorated
- Engine oil viscosity too high

Engine oil level too high
Clutch housing frozen on drive shaft
Clutch hub nut loose
Clutch hub spline damaged
Clutch friction plate installed wrong
Clutch lever play excessive
Clutch release mechanism trouble

Gear Shifting Faulty:

Doesn't go into gear; shift pedal doesn't return:

Clutch not disengaging
Shift fork bent or seized
Gear stuck on the shaft
Gear positioning lever binding
Shift return spring weak or broken
Shift return spring pin loose
Shift mechanism arm spring broken
Shift mechanism arm broken
Shift pawl broken

Jumps out of gear:

Shift fork worn, bent
Gear groove worn
Gear dogs and/or dog holes worn
Shift drum groove worn
Gear positioning lever spring weak or broken
Shift fork pin worn
Drive shaft, output shaft, and/or gear splines worn

Overshifts:

Gear positioning lever spring weak or broken
Shift mechanism arm spring broken

Abnormal Engine Noise:

Knocking:

IC igniter trouble
Carbon built up in combustion chamber
Fuel poor quality or incorrect
Spark plug incorrect
Overheating

Piston slap:

Cylinder/piston clearance excessive
Cylinder, piston worn
Connecting rod bent
Piston pin, piston pin hole worn

Valve noise:

Valve clearance incorrect
Valve spring broken or weak
Camshaft bearing worn
Rocker arm worn
Rocker shaft worn

Other noise:

Connecting rod small end clearance excessive
Connecting rod big end clearance excessive
Piston ring worn, broken, or stuck
Piston seizure, damage
Cylinder head gasket leaking
Exhaust pipe leaking at cylinder head connection
Crankshaft runout excessive
Engine mounts loose
Crankshaft bearing worn
Primary gear worn or chipped
Camshaft chain tensioner trouble
Camshaft chain, sprocket, guide worn
Air suction valve damaged
Vacuum switch valve damaged
Alternator rotor loose

Abnormal Drive Train Noise:

Clutch noise:

Clutch rubber damper weak or damaged
Clutch housing/friction plate clearance excessive
Clutch housing gear worn

Transmission noise:

Bearings worn
Transmission gears worn or chipped
Metal chips jammed in gear teeth
Engine oil insufficient

Drive chain noise:

Drive chain adjusted improperly
Drive chain worn
Rear and/or engine sprocket worn
Chain lubrication insufficient
Rear wheel misaligned

Abnormal Frame Noise:

Front fork noise:

Oil insufficient or too thin
Spring weak or broken

Rear shock absorber noise:

Shock absorber damaged

Disc brake noise:

Pad installed incorrectly
Pad surface glazed
Disc warped
Caliper trouble

Drum brake noise:

Brake linings overworn or worn unevenly
Drum worn unevenly or scored
Brake springs weak or broken
Foreign matter in hub
Brake not properly adjusted

Other noise:

Bracket, nut, bolt, etc. not properly mounted or tightened

Oil Pressure Warning Light Goes On:

Engine oil pump damaged
Engine oil screen clogged
Engine oil level too low
Engine oil viscosity too low
Camshaft bearings worn
Crankshaft bearings worn
Oil pressure switch damaged
Wiring faulty
Relief valve stuck open
O-ring at the oil passage in the crankcase damaged

Exhaust Smokes Excessively:

White smoke:

Piston oil ring worn
Cylinder worn
Valve oil seal damaged
Valve guide worn
Engine oil level too high

Black smoke:

Air cleaner clogged
Main jet too large or fallen off
Starter plunger stuck open
Fuel level in carburetor float bowl too high

Brown smoke:

Main jet too small
Fuel level in carburetor float bowl too low
Air cleaner duct loose
Air cleaner O-ring damaged
Air cleaner poorly sealed or missing

Handling and/or Stability Unsatisfactory:

Handlebar hard to turn:

Cable routing incorrect
Hose routing incorrect
Wiring routing incorrect
Steering stem locknut too tight
Steering stem bearing damaged
Steering stem bearing lubrication inadequate
Steering stem bent
Tire air pressure too low

Handlebar shakes or excessively vibrates:

Tire worn
Swingarm pivot bearings worn
Rim warped, or not balanced
Wheel bearing worn
Handlebar clamp loose
Steering stem head bolt loose

Handlebar pulls to one side:

Frame bent
Wheel misalignment
Swingarm bent or twisted
Steering maladjusted
Front fork bent
Right and left front fork oil level uneven

Shock absorption unsatisfactory:

(Too hard)
Front fork oil excessive
Front fork oil viscosity too high
Rear shock absorber adjustment too hard
Tire air pressure too high
Front fork bent
(Too soft)
Tire air pressure too low
Front fork oil insufficient and/or leaking
Front fork oil viscosity too low
Rear shock adjustment too soft
Front fork, rear shock absorber spring weak
Rear shock absorber oil leaking

Brake Doesn't Hold:

Disc brake:

Air in the brake line
Pad or disc worn
Brake fluid leakage
Disc warped
Contaminated pad
Brake fluid deteriorated
Primary or secondary cup damaged in master cylinder
Master cylinder scratched inside

Drum brake:

Brake maladjusted
Brake linings or drum worn
Overheated
Water in brake drum
Brake cam, camshaft worn
Oil on brake linings

Battery Trouble:

Battery discharged:

Battery faulty (e.g., plates sulphated, shorted through sedimentation, electrolyte insufficient)
Battery leads making poor contact
Load excessive (e.g., bulb of excessive wattage)
Ignition switch trouble
Alternator trouble
Wiring faulty
Regulator/rectifier trouble

Battery overcharged:

Regulator/rectifier trouble
Battery faulty

General Lubrication

Lubrication

- Before lubricating each part, clean off any rusty spots with rust remover and wipe off any grease, oil, dirt, or grime.
- Lubricate the points listed below with indicated lubricant.

NOTE

○ *Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure water spray, perform the general lubrication.*

Pivots: Lubricate with Motor Oil.

Clutch Lever
Brake Lever
Brake Pedal
Side Stand
Rear Brake Rod Joint
Rear Brake Cam Lever

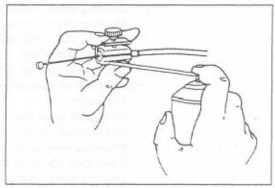
Points: Lubricate with Grease.

Clutch Inner Cable Upper End
Throttle Inner Cable Lower Ends
Speedometer Inner Cable*

(*): Grease the lower part of the inner cable sparingly.

Cables: Lubricate with Rust Inhibiter.

Choke Cable
Throttle Cables
Clutch Cable
Brake Cable



Nut, Bolt, and Fastener Tightness

Tightness Inspection

● Check the tightness of the bolts and nuts listed here. Also, check to see that each cotter pin is in place and in good condition.

NOTE

○ *For the engine fasteners, check the tightness of them when the engine is cold (at room temperature).*

★ If there are loose fasteners, retorque them to the specified torque following the specified tightening sequence. Refer to the appropriate chapter for torque specifications. If torque specifications are not in the appropriate chapter, see the Standard Torque Table. For each fastener, first loosen it by 1/2 turn, then tighten it.

★ If cotter pins are damaged, replace them with new ones.

Nut, Bolt and Fastener to be checked

Wheels:
- Front Axle Nut
- Front Axle Clamp Bolt
- Rear Axle Nut
- Rear Axle Nut Clip

Brakes:
- Master Cylinder Clamp Bolts
- Brake Lever Pivot Nut
- Caliper Mounting Bolts
- Brake Pedal Lever Clamp Bolt
- Cam Lever Clamp Bolt
- Brake Rod Joint Cotter Pin
- Torque Link Nuts
- Torque Link Nut Clips

Suspension:
- Front Fork Clamp Bolts
- Front Fender Bracket Mounting Bolts
- Rear Shock Absorber Mounting Bolts and Nuts
- Swingarm Pivot Shaft Nut
- Uni-Trak Link Nuts

Steering:
- Stem Head Bolt
- Handlebar Clamp Bolts
- Handlebar Holder Mounting Nuts

Engine:
- Engine Mounting Bolts and Nuts
- Shift Pedal Pivot Nut
- Muffler Mounting Bolts and Nut
- Exhaust Pipe Holder Bolts
- Muffler Connecting Clamp Bolt
- Clutch Lever Holder Clamp Bolt
- Clutch Lever Pivot Nut
- Air Cleaner Cover Nut

Others:
- Side Stand Pivot Nut
- Front Footpeg Bracket Mounting Bolts
- Down Tube Mounting Bolts
- Rear Frame Mounting Bolts

Unit Conversion Table

Prefixes for Units:

Prefix	Symbol	Power
mega	M	x 1 000 000
kilo	k	x 1 000
centi	c	x 0.01
milli	m	x 0.001
micro	µ	x 0.000001

Units of Mass:

kg	x	2.205	=	lb
g	x	0.03527	=	oz

Units of Volume:

L	x	0.2642	=	gal (US)
L	x	0.2200	=	gal (imp)
L	x	1.057	=	qt (US)
L	x	0.8799	=	qt (imp)
L	x	2.113	=	pint (US)
L	x	1.816	=	pint (imp)
mL	x	0.03381	=	oz (US)
mL	x	0.02816	=	oz (imp)
mL	x	0.06102	=	cu in

Units of Force:

N	x	0.1020	=	kg
N	x	0.2248	=	lb
kg	x	9.807	=	N
kg	x	2.205	=	lb

Units of Length:

km	x	0.6214	=	mile
m	x	3.281	=	ft
mm	x	0.03937	=	in

Units of Torque:

N-m	x	0.1020	=	kg-m
N-m	x	0.7376	=	ft-lb
N-m	x	8.851	=	in-lb
kg-m	x	9.807	=	N-m
kg-m	x	7.233	=	ft-lb
kg-m	x	86.80	=	in-lb

Units of Pressure:

kPa	x	0.01020	=	kg/cm²
kPa	x	0.1450	=	psi
kPa	x	0.7501	=	cm Hg
kg/cm²	x	98.07	=	kPa
kg/cm²	x	14.22	=	psi
cm Hg	x	1.333	=	kPa

Units of Speed:

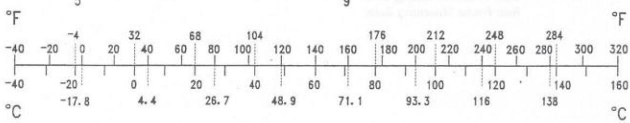
km/h	x	0.6214	=	mph

Units of Power:

kW	x	1.360	=	PS
kW	x	1.341	=	HP
PS	x	0.7355	=	kW
PS	x	0.9863	=	HP

Units of Temperature:

$$\frac{9(°C+40)}{5} - 40 = °F \qquad \frac{5(°F+40)}{9} - 40 = °C$$



Supplement - 2000 - 2001 Models

Table of Contents

How to Use this Manual

This "Supplement - 2000 - 2001 Models" designed to be used in conjunction with the front part of this manual (up to 16-10).

The specifications and maintenance procedures described in this chapter are only those that are unique to the VA800-A6/A7 models.

Complete and proper servicing of the VN800-A6/A7 models therefore requires mechanics to read both this chapter and the front of this manual.

General Information

General Specifications

Items		VN800-A6	VN800-A7
Dimensions:			
Overall length		2 360 mm	
Overall width		825 mm	
Overall height		1 170 mm	
Wheelbase		1 625 mm	
Road clearance		160 mm	
Seat height		710 mm	
Dry mass		225 kg, (CA) 225.5 kg	
Curb mass:	Front	107 kg	
	Rear	137 kg, (CA) 137.5 kg	
Fuel tank capacity		15.0 L	
Performance:			
Minimum turning radius		2.9 m	
Engine:			
Type		4-stroke, SOHC, V2-cylinder	
Cooling system		Liquid-cooled	
Bore and stroke		88.0 × 66.2 mm	
Displacement		805 mL	
Compression ratio		9.5	
Maximum horsepower		(US) – – –	
Maximum torque		(US) – – –	
Carburetion system		Carburetor, Keihin CVK36	
Starting system		Electric starter	
Ignition system		Battery and coil (transistorized)	
Timing advance		Electronically advanced (digital igniter)	
Ignition timing		From 5.0° BTDC @1 000 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm) (CA) From 5.0° BTDC @1 300 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm)	
Spark plugs		NGK CR7E or ND U22ESR-N	
Cylinder numbering method		Front to rear, 1-2	
Firing order		1-2	
Valve timing:			
Inlet	Open	19° BTDC	
	Close	71° ABDC	
	Duration	270°	
Exhaust	Open	69° BBDC	
	Close	31° ATDC	
	Duration	280°	

Items			VN800-A6	VN800-A7
Lubrication system			Forced lubrication (wet sump)	
Engine oil:	Grade		SE, SF or SG class	API SE, SF or SG API SH or SJ with JASO MA
	Viscosity		SAE10W-40, 10W-50, 20W-40, or 20W-50	
	Capacity		3.2 L	
Drive Train:				
Primary reduction system:				
Type			Gear	
Reduction ratio			2.184 (83/38)	
Clutch type			Wet multi disc	
Transmission:				
Type			5-speed, constant mesh, return shift	
Gear ratios:	1st		2.533 (38/15)	
	2nd		1.650 (33/20)	
	3rd		1.230 (32/26)	
	4th		1.000 (29/29)	
	5th		0.857 (24/28)	
Final drive system:				
Type			Chain drive	
Reduction ratio			2.470 (42/17)	
Overall drive ratio			4.625 @Top gear	
Frame:				
Type			Tubular, double cradle	
Caster (rake angle)			34°	
Trail			149 mm	
Front tire:	Type		Tube	
	Size		80/90-21 48H	
Rear tire:	Type		Tube	
	Size		140/90-16 71H	
Front suspension:	Type		Telescopic fork	
	Wheel travel		150 mm	
Rear suspension:	Type		Swingarm (uni-trak)	
	Wheel travel		100 mm	
Brake Type:	Front		Single disc	
	Rear		Drum	
Electrical Equipment:				
Battery			12 V 12 Ah	
Headlight:	Type		Semi-sealed beam	
	Bulb		12 V 60/55 W (quartz-halogen)	
Tail/brake light			12 V 8/27 W × 2	12 V 5/21 W × 2
Alternator:	Type		Three-phase AC	
	Rated output		23.5 A/14 V @8 000 r/min (rpm)	

Specifications subject to change without notice, and may not apply to every country.
(CA): California Model
(US): U.S.A. Model

ENGINE LUBRICATION SYSTEM

Specifications

Item	Standard	Service Limit
Engine Oil:		
Grade	SE,SF,or SG class	– – –
	(On and After VN800-A7)	
	API SE, SF or SG	
	API SH or SJ with JASO MA	
Viscosity	SAE 10W-40, 10W-50, 20W-40, or 20W-50	– – –
Capacity:	2.7 L (when filter is not removed)	– – –
	2.9 L (when filter is removed)	– – –
	3.2 L (when engine is completely dry)	– – –
Oil pump:		
Oil pump drive chain 20-link length	127.0 ~ 127.4 mm	128.9 mm
Oil Pressure Measurement:		
Oil pressure @4,000 r/min (rpm), oil temp. 100°C (212°F)	355 ~ 410 kPa (3.6 ~ 4.2 kg/cm^2, 51~ 60 psi)	– – –

Special Tool - **Oil Pressure Gauge, 10 kg/cm^2: 57001-164**
Oil Pressure Gauge Adapter, PT 1/8: 57001-1033
Oil Filter Wrench: 57001-1249

Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

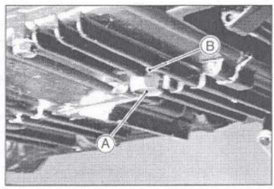
Engine Oil and Oil Filter

Engine Oil Change

● Support the motorcycle perpendicular to the ground after warning up the engine.
● Remove the engine drain plug [A] to drain the oil.
○ The oil in the oil filter can be drained by removing the filter (see Oil Filter Change).
★ Replace the drain plug gasket [B] with a new one if it is damaged.
● Tighten the drain plug.

Torque - Engine Drain Plug: 20 N·m (2.0 kg·m, 14.5 ft·lb)

● Pour in the specified type and amount of oil.



Engine Oil

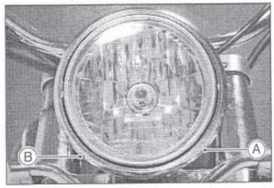
Grade:	**SE, SF, or SG class**
	(On and After VN800-A7)
	API SE, SF or SG
	API SH or SJ with JASO MA
Viscosity:	**SAE 10W40, 10W50, 20W40, or 20W50**
Amount:	**2.7 L (when filter is not removed)**
	2.9 L (when filter is removed)
	3.2 L (when engine is completely dry)

ELECTRICAL SYSTEM

Lighting System (On and After VN800–A7)

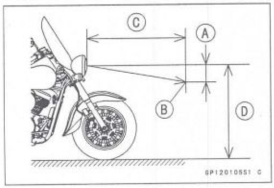
Headlight Beam Horizontal Adjustment

- Turn the horizontal adjuster [A] on the headlight in or out until the beam points straight ahead.



Headlight Beam Vertical Adjustment

- Turn the vertical adjuster [B] on the headlight in or out to adjust the headlight vertically.



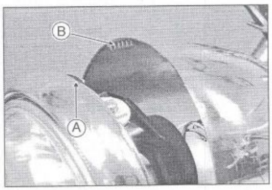
NOTE

- ○ *On high beam, the brightest points should be slightly below horizontal with the motorcycle on its wheels and the rider seated. Adjust the headlight(s) to the proper angle according to local regulations.*
- ○ *For US model, the proper angle is 0.4 degrees below horizontal. This is 50 mm (2 in) drop at 7.6 m (25 ft) measured from the center of the headlights with the motorcycle on its wheels and the rider seated.*

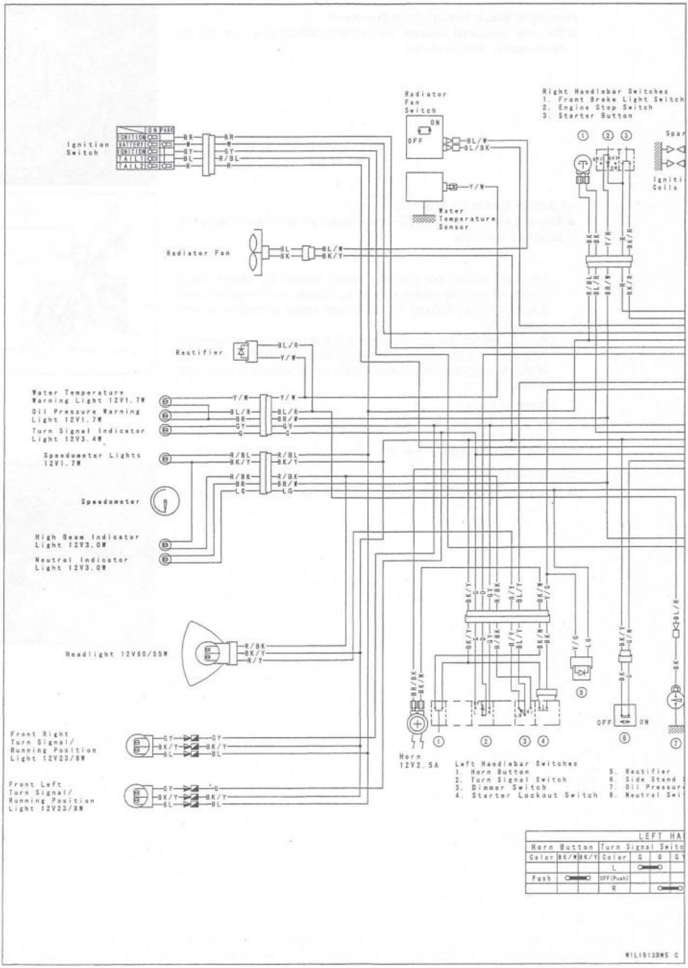
50 mm (2 in) [A]
Center of Brightest Spot [B]
7.6 m (25 ft) [C]
Height of Headlight Center [D]

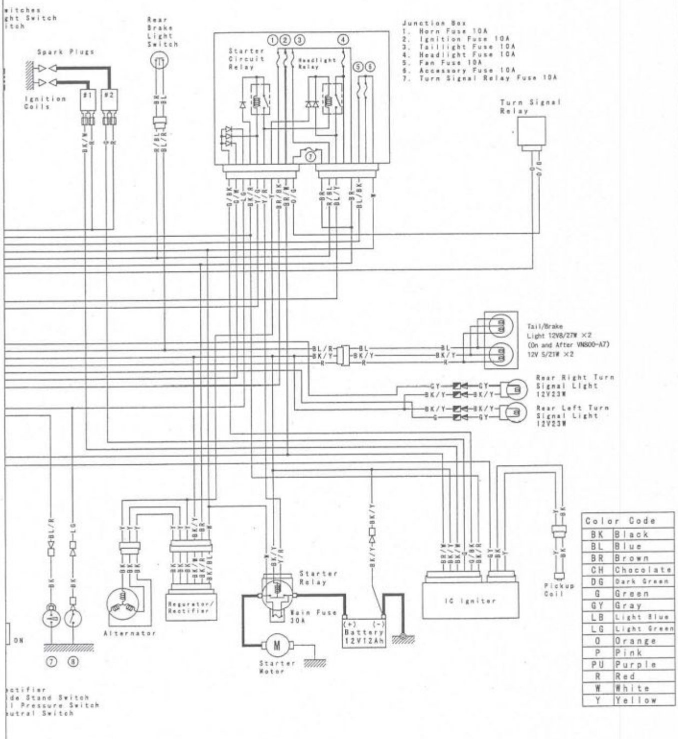
Headlight Unit Installation

- Install the tongue of headlight unit into the hook of headlight body.



VN800–A6/A7 Wiring Diagram (U.S.A. Model)





Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

LEFT HANDLEBAR SWITCH CONNECTIONS

gnal Switch			Dimmer Switch				Starter Lockout Switch		
G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK
○	○		HI		○	○	Clutch Lever		
							Released		
	○	○	LO	○	○		Pulled in	○	○

IGNITION SWITCH CONNECTIONS

	Ignition	Battery	Ignition	Tail1	Tail2
Color	BR	*W	GY	BL	R
OFF, LOCK					
ON	○	○	○	○	○
P		○			○

RIGHT HANDLEBAR SWITCH CONNECTIONS

Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	R	BK/R
Brake Lever			OFF					
Pulled in	○	○	RUN	○	○	Push	○	○

(98051-1913B)C

WIRI912BWS C

Supplement-2002 ~ 2003 Models

Table of Contents

Foreword

How to Use this Manual

This "Supplement-2002 ~ 2003 Models" designed to be used in conjunction with the front part of this manual (up to 17-9). The specifications and maintenance procedures described in this chapter are only those that are unique to the VN800-A8 ~ A9 models.

Complete and proper servicing of the VN800-A8 ~ A9 models therefore requires mechanics to read both this chapter and the front of this manual.

General Information

General Specifications

Items		VN800-A8 ~ A9
Dimensions:		
Overall length		2 360 mm
Overall width		825 mm
Overall height		1 170mm
Wheelbase		1 625mm
Road clearance		160 mm
Seat height		710 mm
Dry weight		225 kg, (CA) 225.5 kg
Curb weight	Front	107 kg
	Rear	137 kg, (CA) 137.5 kg
Fuel tank capacity		15.0 L
Performance:		
Minimum turning radius		2.9 m
Engine:		
Type		4-stroke, SOHC, V2-cylinder
Cooling system		Liquid-cooled
Bore and stroke		88.0 × 66.2 mm
Displacement		805 mL
Compression ratio		9.5
Maximum horsepower		(US) – – –
Maximum torque		(US) – – –
Carburetion system		Carburetor, Keihin CVK36
Starting system		Electric starter
Ignition system		Battery and coil (transistorized)
Timing advance		Electronically advanced (digital igniter)
Ignition timing		From 5.0° BTDC @1 000 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm) (CA) From 5.0° BTDC @1 300 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm)
Spark plugs		NGK CR7E or ND U22ESR-N
Cylinder numbering method		Front to rear, 1-2
Firing order		1-2
Valve timing:		
Inlet	Open	19° BTDC
	Close	71° ABDC
	Duration	270°
Exhaust	Open	69° BBDC
	Close	31° ATDC
	Duration	280°
Lubrication system		Forced lubrication (wet sump)
Engine oil:	Type	API SE, SF or SG, API SH or SJ with JASO MA
	Viscosity	SAE10W-40
	Capacity	3.2 L

General Information

Items		VN800-A8 ~ A9
Drive Train:		
Primary reduction system:		
Type		Gear
Reduction ratio		2.184 (83/38)
Clutch type		Wet multi disc
Transmission:		
Type		5-speed, constant mesh, return shift
Gear ratios:	1st	2.533 (38/15)
	2nd	1.650 (33/20)
	3rd	1.230 (32/26)
	4th	1.000 (29/29)
	5th	0.857 (24/28)
Final drive system:		
Type		Chain drive
Reduction ratio		2.470 (42/17)
Overall drive ratio		4.625 @Top gear
Frame:		
Type		Tubular, double cradle
Caster (rake angle)		34°
Trail		149 mm
Front tire:	Type	Tube
	Size	80/90-21 48H (VN800-A8) 80/90-21 M/C 48H (VN800-A9)
Rear tire:	Type	Tube
	Size	140/90-16 71H (VN800-A8) 140/90-16 M/C 71H (VN800-A9)
Front suspension:	Type	Telescopic fork
	Wheel travel	150 mm
Rear suspension:	Type	Swingarm (uni-trak)
	Wheel travel	100 mm
Brake Type:	Front	Single disc
	Rear	Drum
Electrical Equipment:		
Battery		12 V 12 Ah
Headlight:	Type	Semi-sealed beam
	Bulb	12 V 60/55 W (quartz-halogen)
Tail/brake light		12 V 5/21 W × 2
Alternator:	Type	Three-phase AC
	Rated output	23.5 A/14 V @8 000 r/min (rpm)

Specifications are subject to change without notice, and may not apply to every country.
(CA) : California Model
(US) : U.S.A. Model

General Information

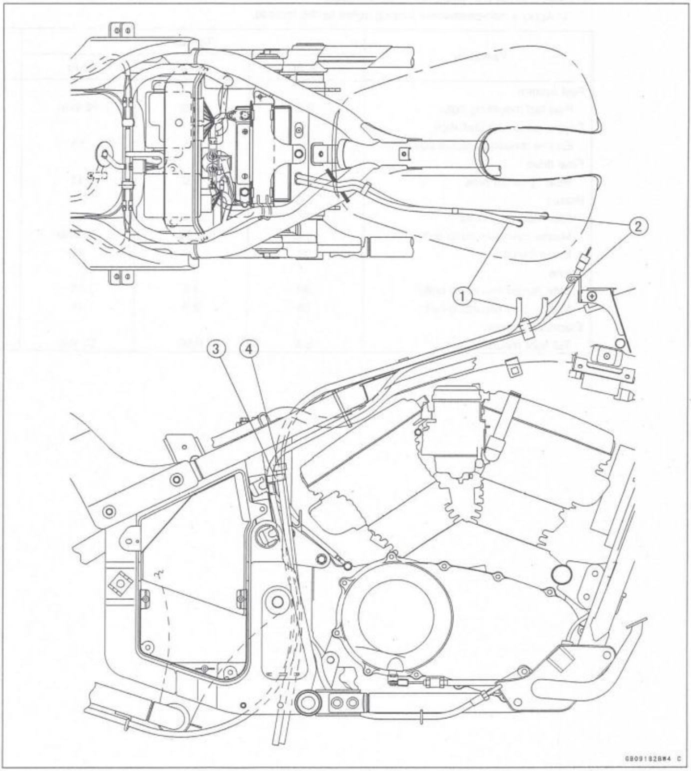
Torque and Locking Agent

Letters used in the "Remarks" column mean:

L: Apply a non-permanent locking agent to the threads.

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel system				
Fuel tap mounting bolts	2.5	0.25	22 in·lb	
Engine removal/installation				
Engine mouting bracket botls	25	2.5	18	
Final drive				
Rear sprocket nuts	59	6.0	43	
Brakes				
Disc mounting bolts	27	2.8	20	L
Master cylinder clamp bolts	8.8	0.90	78 in·lb	
Brake pedal bolt	25	2.6	19	
Frame				
Step holder mounting bolts	34	3.5	25	
Muffler stay mounting bolts	25	2.6	19	
Electrical system				
Tail light mounting nuts	5.9	0.60	52 in·lb	

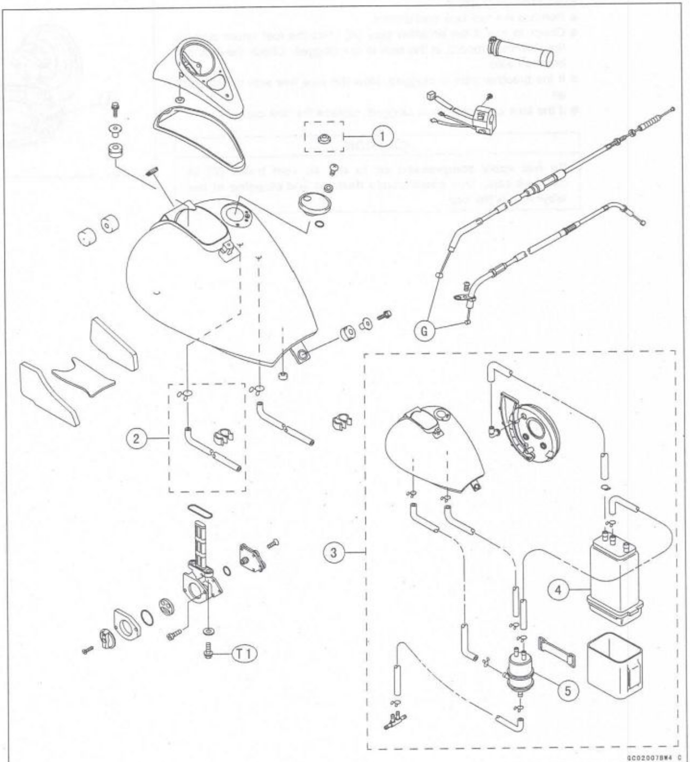
Cable, Wire, and Hose Routing



1. Fuel Tank Drain Hose
2. Fuel Tank Breather Hose
3. Clamp (Fuel tank drain and speed meter cable)
4. Clamp (Speed meter cable and breather hose)

Fuel Sytem

Exploded View

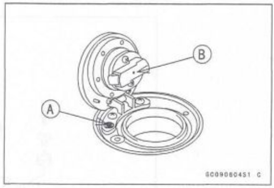


1. California Model
2. Other than California Model
3. Evaporative Emission Control System (California Model)
4. Canister
5. Separator
G: Apply grease.
T1: 2.5 N·m (0.25 kgf·m, 22 in·lb)

Fuel System

Fuel Tank Inspection

- Remove the fuel tank and drain it.
- Check to see if the breather pipe [A] (also the fuel return pipe for the California model) in the tank is not clogged. Check the tank cap breather also.
- If the breather pipe is clogged, blow the pipe free with compressed air.
- If the tank cap breather is clogged, replace the tank cap.



CAUTION

Do not apply compressed air to the air vent holes [B] in the tank cap. This could cause damage and clogging of the labyrinth in the cap.

Clutch

Specification

Item	Standard	Service Limit
Clutch Lever:		
Clutch lever free play	2 ~ 3 mm	– – –
Clutch:		
Friction plate thickness	2.9 ~ 3.1 mm	2.8 mm
Friction and steel plate warp	0.2 mm or less	0.3 mm
Clutch spring free length	35.3 mm	34.1 mm

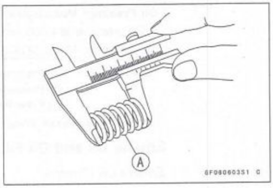
Special Tool - Clutch Holder: 57001–1243

Clutch

Clutch Spring Free Length Measurement

● Measure the free length of the clutch springs [A].
★ If any spring is shorter than the service limit, it must be replaced.

Clutch Spring Free Length
Standard: 35.3 mm
Service Limit 34.1 mm



Engine Lublication system

Specifications

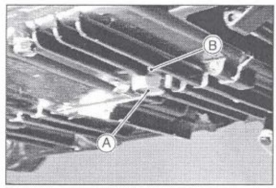
Item	Standard	Service Limit
Engine oil:		
Type	API SE, SF or SG API SH or SJ with JASO MA	– – –
Viscosity	SAE 10W–40	– – –
Capacity	2.7 L (when filter is not removed)	– – –
	2.9 L (when filter is removed)	– – –
	3.2 L (when engine is completely dry)	– – –
Oil Pump:		
Oil Pump drive chain 20-link lenght	127.0 ~ 127.4 mm	128.9 mm
Oil Pressure Measurement:		
Oil pressure @4 000 r/min (rpm), oil temp. 100°C (212°F)	355 ~ 410 kPa (3.6 ~ 4.2 kgf/cm², 51 ~ 60 psi)	– – –

Special Tool - **Oil Pressure Gauge, 10 kgf/cm²: 57001–164**
Oil Pressure Gauge Adapter, PT 1/8: 57001–1033
Oil Filter Wrench: 57001–1249

Sealant - **Kawasaki Bond (Silicone Sealand): 57001–120**

Engine Oil and Oil Filter

Engine Oil Change



● Support the motorcycle perpendicular to the ground after warning up the engine.
● Remove the engine drain plug [A] to drain the oil.
○ The oil in the oil filter can be drained by removing the filter (see Oil Filter Change).
★ Replace the drain plug gasket [B] with a new one if it is damaged.
● Tighten the drain plug.

Torque - **Engine Drain Plug: 20 N·m (2.0 kgf·m, 14.5 ft·lb)**

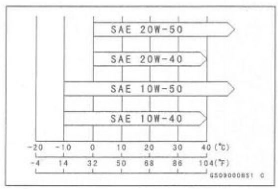
● Pour in the specified type and amount of oil.

Recommended Engine Oil

Type:	**API SE, SF or SG**
	API SH or SJ with JASO MA
Viscosity:	**SAE 10W-40**
Capacity:	**2.7 L (when filter is not removed)**
	2.9 L (when filter is removed)
	3.2 L (when engine is completely dry)

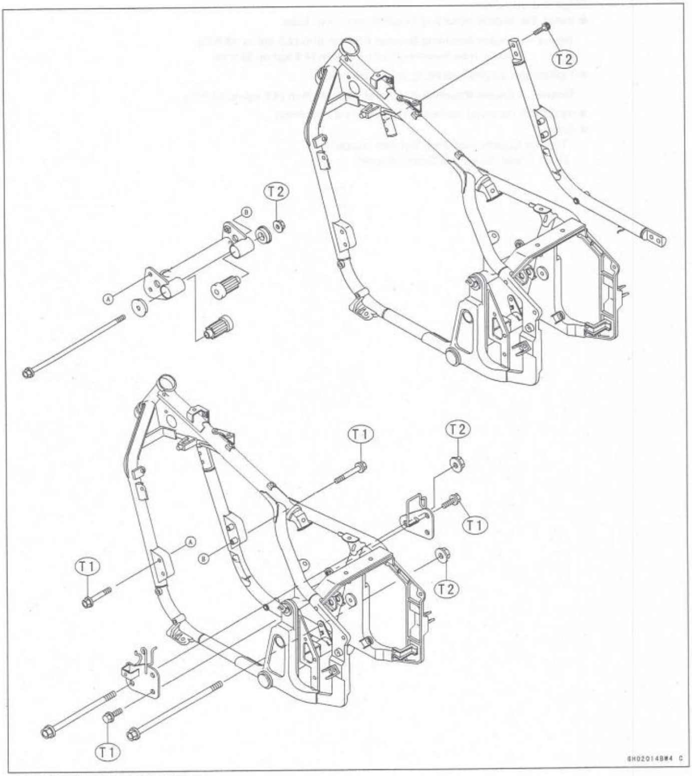
NOTE

○ *Although 10W-40 engine oil is the recommended oil for most conditions, the oil viscosity may need to be changed to accommodate atmospheric conditions in your riding area.*



Engine Removal/Installation

Exploded View



T1: 25 N·m (2.5 kgf·m, 18 ft·lb)
T2: 44 N·m (4.5 kgf·m, 33 ft·lb)

Engine Removal/Installation

Engine Installation

- Install the engine mounting bracket and down tube.

  Torque - Engine Mounting Bracket Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)
  Down Tube Mounting Bolts: 44 N·m (4.5 kgf·m, 33 ft·lb)

- Tighten the engine mounting bolts and nuts.

  Torque - Engine Mounting Bolts and Nuts: 44 N·m (4.5 kgf·m, 33 ft·lb)

- Install the removed parts (see appropriate chapters).
- Adjust:
  Throttle Cables (see Fuel System chapter)
  Drive Chain (see Final Drive chapter)

Wheels/Tires

Specifications

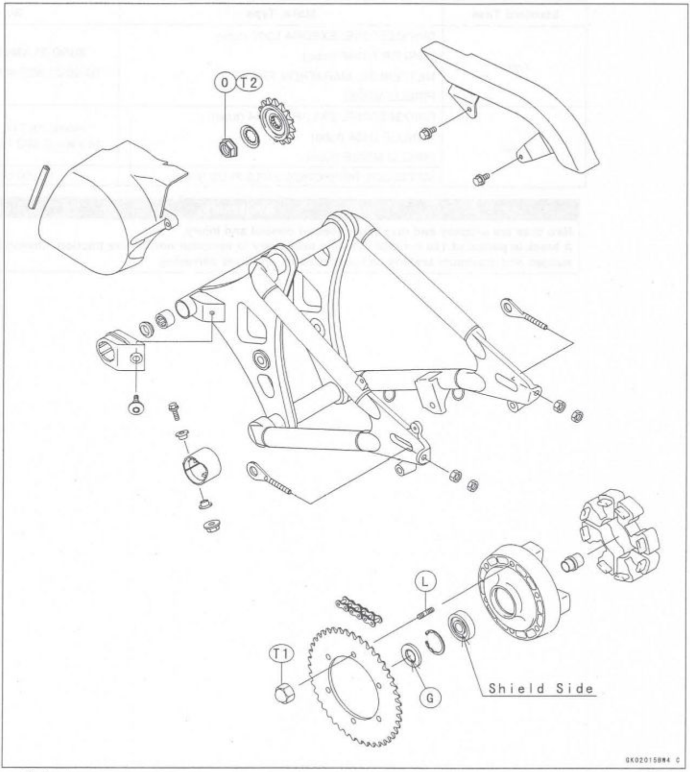
Standard Tires	Make, Type	Size
Front	BRIDGESTONE, EXEDRA L307 (tube) DUNLOP, D404F (tube) METZERLER, MARATHON FRONT PIRELLI MT69E	80/90-21 48H (VN800-A8) 80-90-21 M/C 48H (VN800-A9)
Rear	BRIDGESTONE, EXEDRA G544 (tube) DUNLOP D404 (tube) PIRELLI MT68E (tube)	140/90-16 71H (VN800-A8) 140/90-16 M/C 71H (VN800-A9)
	METZELER, REINFORCED ML2 PLUS (tube)	140/90-B16 71H

⚠WARNING

New tires are slippery and may cause loss of control and injury.
A break-in period of 160 km (100 miles) is necessary to establish normal tire traction. During break-in, avoid sudden and maximum braking and acceleration, and hard cornering.

Final Drive

Exploded View

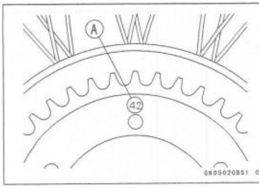


G: Apply grease.
L: Apply non-permanent locking agent.
O: Apply oil.
T1: 59 N·m (6.0 kgf·m, 43 ft·lb)
T2: 125 N·m (13.0 kg·fm, 94 ft·lb)

Final Drive

Sprocket, Coupling

Rear Sprocket Installation



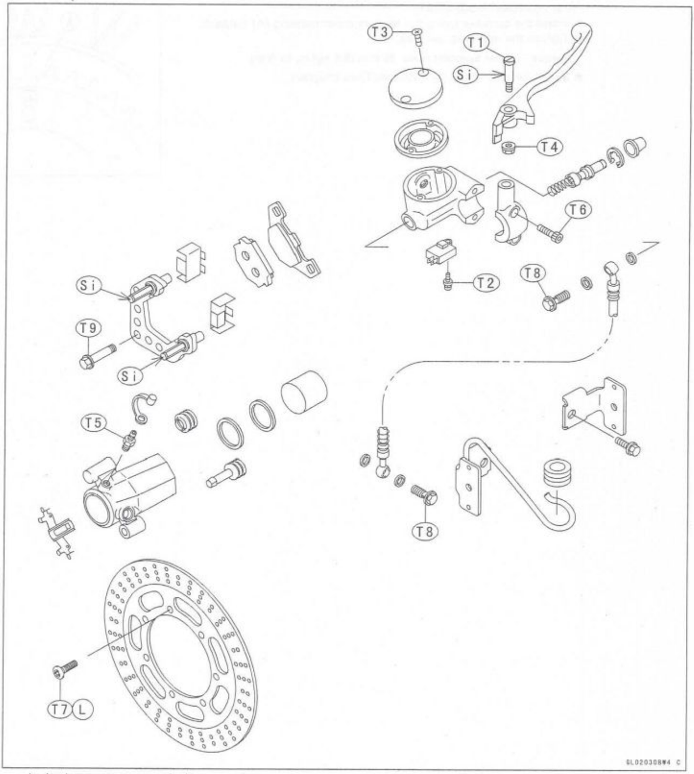
- Install the sprocket facing the tooth number marking [A] outward.
- Tighten the rear sprocket nuts.

Torque - Rear Sprocket Nuts: 59 N·m (6.0 kgf·m, 43 ft·lb)

- Install the rear wheel (see Wheels/Tires chapter).

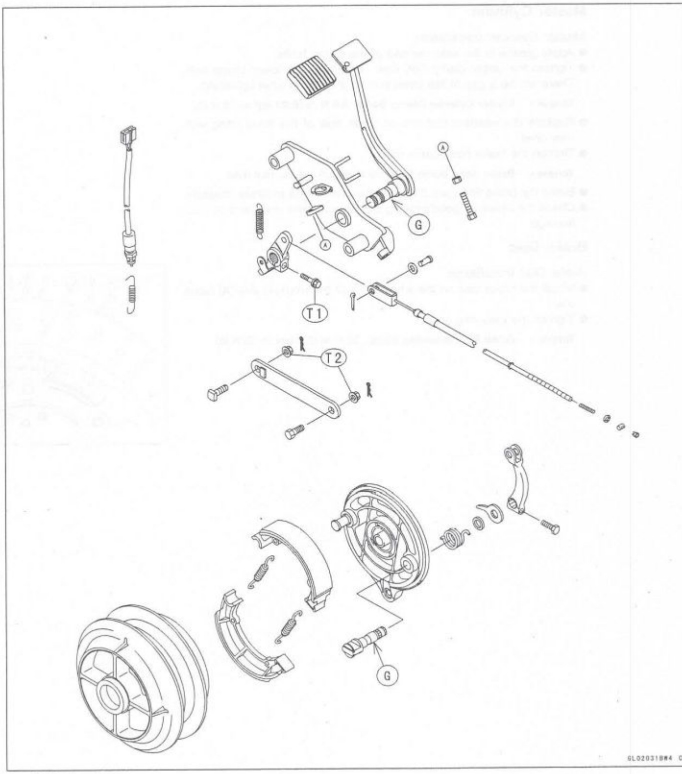
Brakes

Exploded View



L: Apply non-permanent locking agent.
Si: Apply silicone grease.
T1: 1.0 N·m (0.10 kgf·m, 9 in·lb)
T2: 1.2 N·m (0.12 kgf·m, 10 in·lb)
T3: 1.5 N·m (0.15 kgf·m, 13 in·lb)
T4: 5.9 N·m (0.60 kgf·m, 52 in·lb)
T5: 7.8 N·m (0.80 kgf·m, 69 in·lb)
T6: 8.8 N·m (0.90 kgf·m, 78 in·lb)
T7: 27 N·m (2.8 kgf·m, 20 ft·lb)
T8: 25 N·m (2.5 kgf·m, 18 ft·lb)
T9: 34 N·m (3.5 kgf·m, 25 ft·lb)

Brakes



G: Apply grease.
T1: 25 N·m (2.6 kgf·m, 19 ft·lb)
T2: 34 N·m (3.5 kgf·m, 25 ft·lb)

Master Cylinder

Master Cylinder Installation

- Apply grease to the exterme end of the clamp bolts.
- Tighten the upper clamp bolt first. and then the lower clamp bolt. There will be a gap at the lower part of the clamp after tightening.

Torque - Master Cylinder Clamp Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)

- Replace the washers that are on each side of the hose fitting with new ones.
- Tighten the brake hose banjo bolt.

Torque - Brake Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18.0 ft·lb)

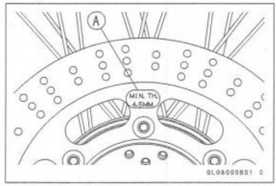
- Bleed the brake line (see Bleeding the Brake Line in Brake chapter).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

Brake Disc

Brake Disc Installation

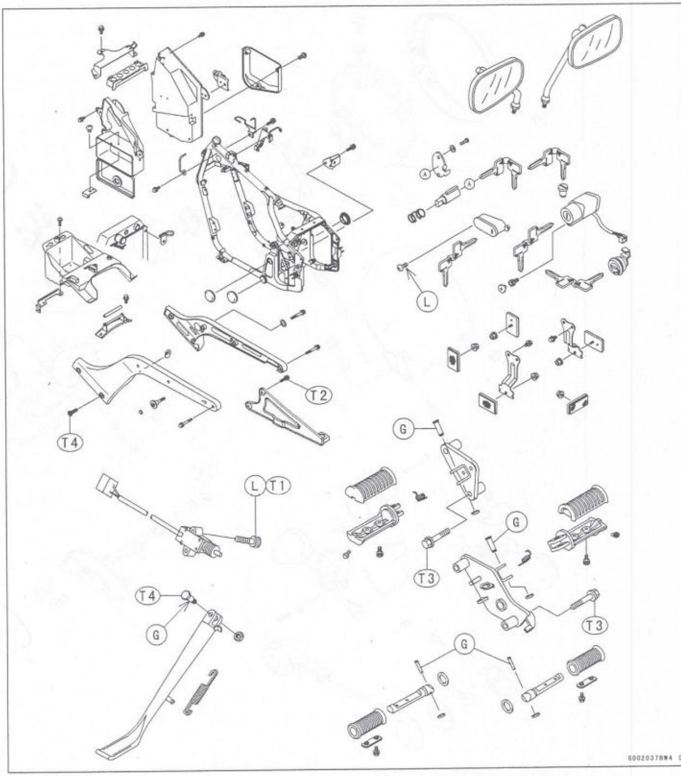
- Install the brake disc on the wheel so that the marked side [A] faces out.
- Tighten the mounting bolts.

Torque - Brake Disc Mounting Bolts: 27 N·m (2.8 kgf·m, 20 ft·lb)



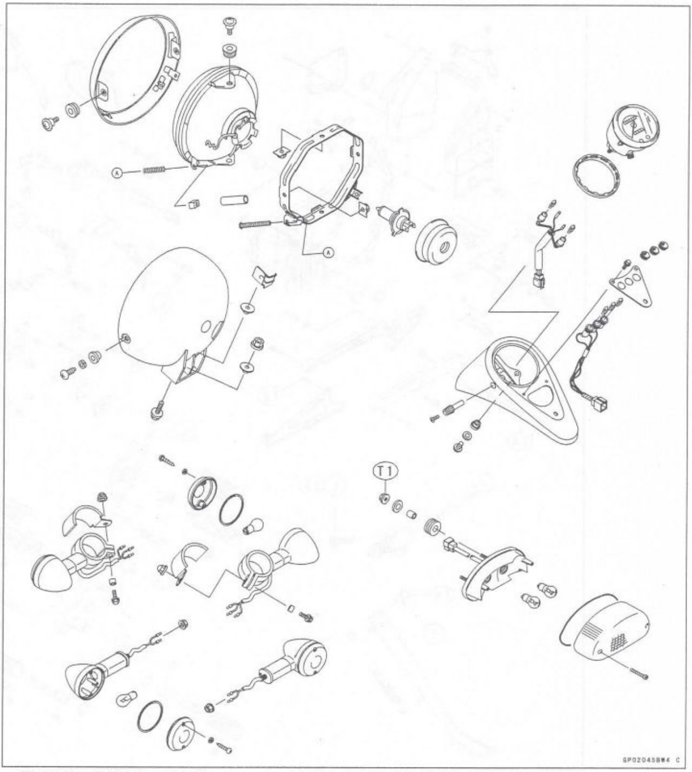
Frame

Exploded View



G: Apply grease.
L: Apply non-permanent locking agent.
T1: 3.9 N·m (0.40 kgf·m, 35 in·lb)
T2: 25 N·m (2.6 kg·fm, 19 ft·lb)
T3: 34 N·m (3.5 kgf·m, 25 ft·lb)
T4: 44 N·m (4.5 kgf·m, 33 ft·lb)

Exploded View



T1: 5.9 N·m (0.60 kgf·m, 52 in·lb)

Supplement-2004 Model

Table of Contents

Foreword

How to Use this Manual

This "Supplement-2004 Model" designed to be used in conjunction with the front part of this manual (up to 18-20). The specifications and maintenance procedures described in this chapter are only those that are unique to the VN800-A10 model.

Complete and proper servicing of the VN800-A10 model therefore requires mechanics to read both this chapter and the front of this manual.

General Information

General Specifications

Items		VN800-A10
Dimensions:		
Overall length		2 360 mm
Overall width		825 mm
Overall height		1 170mm
Wheelbase		1 625mm
Road clearance		160 mm
Seat height		710 mm
Dry weight		225 kg, (CA) 225.5 kg
Curb weight	Front	107 kg
	Rear	137 kg, (CA) 137.5 kg
Fuel tank capacity		15.0 L
Performance:		
Minimum turning radius		2.9 m
Engine:		
Type		4-stroke, SOHC, V2-cylinder
Cooling system		Liquid-cooled
Bore and stroke		88.0 × 66.2 mm
Displacement		805 mL
Compression ratio		9.5
Maximum horsepower		(US) – – –
Maximum torque		(US) – – –
Carburetion system		Carburetor, Keihin CVK36
Starting system		Electric starter
Ignition system		Battery and coil (transistorized)
Timing advance		Electronically advanced (digital igniter)
Ignition timing		From 5.0° BTDC @1 000 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm) (CA) From 5.0° BTDC @1 300 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm)
Spark plugs		NGK CR7E or ND U22ESR-N
Cylinder numbering method		Front to rear, 1-2
Firing order		1-2
Valve timing:		
Inlet	Open	19° BTDC
	Close	71° ABDC
	Duration	270°
Exhaust	Open	69° BBDC
	Close	31° ATDC
	Duration	280°
Lubrication system		Forced lubrication (wet sump)
Engine oil:	Type	API SE, SF or SG, API SH or SJ with JASO MA
	Viscosity	SAE10W-40
	Capacity	3.2 L

General Information

Items		VN800-A10
Drive Train:		
Primary reduction system:		
Type		Gear
Reduction ratio		2.184 (83/38)
Clutch type		Wet multi disc
Transmission:		
Type		5-speed, constant mesh, return shift
Gear ratios:	1st	2.533 (38/15)
	2nd	1.650 (33/20)
	3rd	1.230 (32/26)
	4th	1.000 (29/29)
	5th	0.857 (24/28)
Final drive system:		
Type		Chain drive
Reduction ratio		2.470 (42/17)
Overall drive ratio		4.625 @Top gear
Frame:		
Type		Tubular, double cradle
Caster (rake angle)		34°
Trail		149 mm
Front tire:	Type	Tube
	Size	80/90-21 M/C 48H
Rear tire:	Type	Tube
	Size	140/90-16 M/C 71H
Front suspension:	Type	Telescopic fork
	Wheel travel	150 mm
Rear suspension:	Type	Swingarm (uni-trak)
	Wheel travel	100 mm
Brake Type:	Front	Single disc
	Rear	Drum
Electrical Equipment:		
Battery		12 V 12 Ah
Headlight:	Type	Semi-sealed beam
	Bulb	12 V 60/55 W (quartz-halogen)
Tail/brake light		12 V 5/21 W × 2
Alternator:	Type	Three-phase AC
	Rated output	23.5 A/14 V @8 000 r/min (rpm)

Specifications are subject to change without notice, and may not apply to every country.

(CA) : California Model

(US) : United States Model

Engine Lublication system

Specifications

Item	Standard	Service Limit
Engine oil:		
Type	API SE, SF or SG	– – –
	API SH or SJ with JASO MA	
Viscosity	SAE 10W–40	– – –
Capacity	2.7 L (when filter is not removed)	– – –
	2.9 L (when filter is removed)	– – –
	3.2 L (when engine is completely dry)	– – –
Oil Pump:		
Oil Pump drive chain 20-link lenght	127.0 ~ 127.4 mm	128.9 mm
Oil Pressure Measurement:		
Oil pressure @4 000 r/min (rpm), oil temp. 100°C (212°F)	355 ~ 410 kPa (3.6 ~ 4.2 kgf/cm², 51 ~ 60 psi)	– – –

Special Tool - Oil Pressure Gauge, 10 kgf/cm²: 57001–164
Oil Pressure Gauge Adapter, PT 1/8: 57001–1033
Oil Filter Wrench: 57001–1249

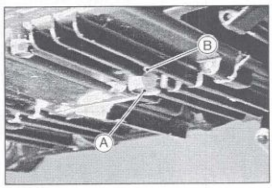
Sealant - Kawasaki Bond (Silicone Sealand): 57001–120

Engine Oil and Oil Filter

Engine Oil Change

● Support the motorcycle perpendicular to the ground after warning up the engine.
● Remove the engine drain plug [A] to drain the oil.
○The oil in the oil filter can be drained by removing the filter (see Oil Filter Change).
★Replace the drain plug gasket [B] with a new one if it is damaged.
● Tighten the drain plug.

Torque - Engine Drain Plug: 20 N·m (2.0 kgf·m, 14.5 ft·lb)

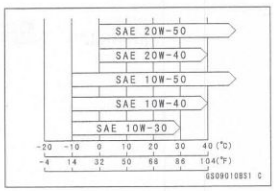


● Pour in the specified type and amount of oil.

Recommended Engine Oil
Type: API SE, SF or SG
API SH or SJ with JASO MA
Viscosity: SAE 10W-40
Capacity: 2.7 L (when filter is not removed)
2.9 L (when filter is removed)
3.2 L (when engine is completely dry)

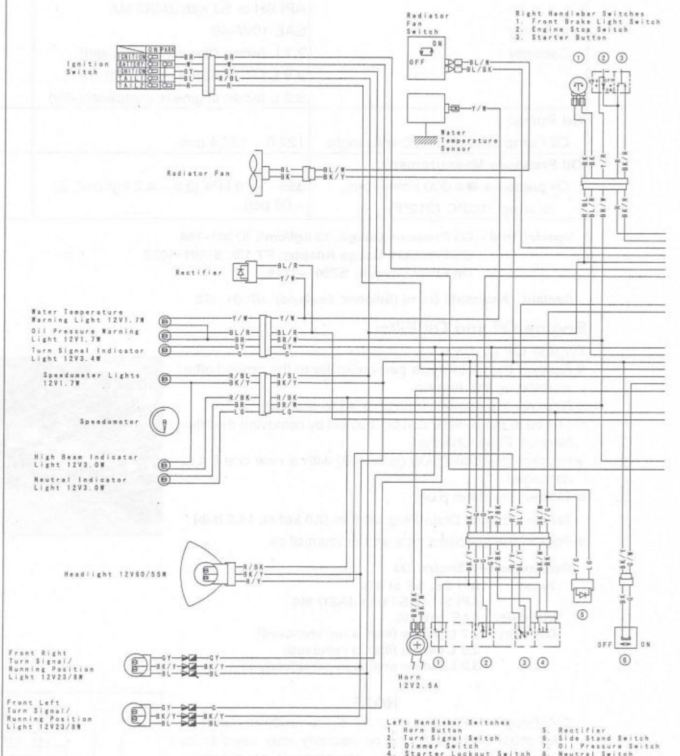
NOTE

○*Although 10W-40 engine oil is the recommended oil for most conditions, the oil viscosity may need to be changed to accommodate atmospheric conditions in your riding area.*



Electrical System

VN800–A10 Writing Diagram (United States Model)

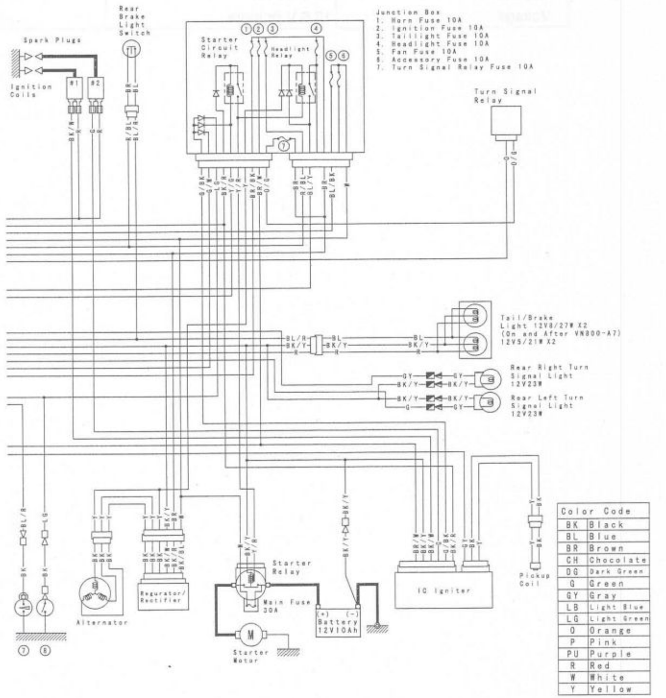


LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switch		
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK
			L	○	○		HI		○	○	Clutch Lever		
Push	○	○	OFF (Push)								Released		
			R		○	○	LO	○	○		Pulled in	○	○

W2L0074AW5 C

Electrical System



IGNITION SWITCH CONNECTIONS					
	Ignition	Battery	Ignition	Tail1	Tail2
Color	BR	W	GY	BL	R
OFF, LOCK					
ON	○	○	○	○	○
P		○			○

RIGHT HANDLEBAR SWITCH CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	R	BK/R
Brake Lever			OFF					
Pulled In	○	○	RUN	○	○	Push	○	○

(98052-0074A)

W2R0074AW5 C

Electrical System

Specifications

Item	Standard	Service Limit
Battery:		
Type	Sealed battery	– – –
Capacity	12 V 10 Ah	– – –
Voltage	12.6 V or more	– – –

MODEL APPLICATION

Year	Model	Beginning Frame No.
1995	VN800–A1	JKBVNCA1□SA000001, or VN800A-000001
1996	VN800–A2	JKBVNCA1□TA030001, or VN800A-030001
1997	VN800–A3	JKBVNCB1□VA050001 ~ VN800A-050001
1998	VN800–A4	JKBVNCA1□WA063001, JKBVNCA1□WB500001, or VN800A-000001
1999	VN800–A5	JKBVNCA1□XA075001, JKBVNCA1□XB501401, or JKBVN800AAA075001
2000	VN800–A6	JKBVNCA1□YB503301
2001	VN800–A7	JKBVNCA1□1B505601
2002	VN800–A8	JKBVNCA1□2B508001
2003	VN800–A9	JKBVNCA1□3B516901
2004	VN800–A10	JKBVNCA1□4B511901

□:This digit in the frame number changes from one machine to another.

Kawasaki

Part No.99924-1183-08

Kawasaki

VULCAN800 CLASSIC
VN800 CLASSIC



Motorcycle Service Manual Supplement

Quick Reference Guide

This quick reference guide will assist you in locating a desired topic or procedure.

- Bend the pages back to match the black tab of the desired chapter number with the black tab on the edge at each table of contents page.
- Refer to the sectional table of contents for the exact pages to locate the specific topic required.

Kawasaki

VULCAN800 CLASSIC
VN800 CLASSIC

Motorcycle Service Manual Supplement

LIST OF ABBREVIATIONS

A	ampere(s)	lb	pound(s)
ABDC	after bottom dead center	m	meter(s)
AC	alternating current	min	minute(s)
ATDC	after top dead center	N	newton(s)
BBDC	before bottom dead center	Pa	pascal(s)
BDC	bottom dead center	PS	horsepower
BTDC	before top dead center	psi	pound(s) per square inch
°C	degree(s) Celsius	r	revolution
DC	direct current	rpm	revolution(s) per minute
F	farad(s)	TDC	top dead center
°F	degree(s) Fahrenheit	TIR	total indicator reading
ft	foot, feet	V	volt(s)
g	gram(s)	W	watt(s)
h	hour(s)	Ω	ohm(s)
L	liter(s)		

Read OWNER'S MANUAL before operating.

EMISSION CONTROL INFORMATION

To protect the environment in which we all live, Kawasaki has incorporated crankcase emission (1) and exhaust emission (2) control systems in compliance with applicable regulations of the United States Environmental Protection Agency.

1. Crankcase Emission Control System

   This system eliminates the release of crankcase vapors into the atmosphere. Instead, the vapors are routed through an oil separator to the intake side of the engine. While the engine is operating, the vapors are drawn into the combustion chamber, where they are burned along with the fuel and air supplied by the carburetion system.

2. Exhaust Emission Control System

   This system reduces the amount of pollutants discharged into the atmosphere by the exhaust of this motorcycle. The fuel and ignition systems of this motorcycle have been carefully designed and constructed to ensure an efficient engine with low exhaust pollutant levels.

The Clean Air Act, which is the Federal law covering motor vehicle pollution, contains what is commonly referred to as the Act's "tampering provisions."

"Sec. 203(a) The following acts and the causing thereof are prohibited...

(3)(A) for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title prior to its sale and delivery to the ultimate purchaser, or for any manufacturer or dealer knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser.

(3)(B) for any person engaged in the business of repairing, servicing, selling, leasing, or trading motor vehicles or motor vehicle engines, or who operates a fleet of motor vehicles knowingly to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title following its sale and delivery to the ultimate purchaser..."

NOTE

○ *The phrase "remove or render inoperative any device or element of design" has been generally interpreted as follows:*

1. Tampering does not include the temporary removal or rendering inoperative of devices or elements of design in order to perform maintenance.

2. Tampering could include:

a. Maladjustment of vehicle components such that the emission standards are exceeded.

b. Use of replacement parts or accessories which adversely affect the performance or durability of the motorcycle.

c. Addition of components or accessories that result in the vehicle exceeding the standards.

d. Permanently removing, disconnecting, or rendering inoperative any component or element of design of the emission control systems.

WE RECOMMEND THAT ALL DEALERS OBSERVE THESE PROVISIONS OF FEDERAL LAW, THE VIOLATION OF WHICH IS PUNISHABLE BY CIVIL PENALTIES NOT EXCEEDING $10,000 PER VIOLATION.

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering are the acts listed below:

- Replacement of the original exhaust system or muffler with a component not in compliance with Federal regulations.
- Removal of the muffler(s) or any internal portion of the muffler(s).
- Removal of the air box or air box cover.
- Modifications to the muffler(s) or air intake system by cutting, drilling, or other means if such modifications result in increased noise levels.

Foreword

This VN800B Service Manual Supplement is designed to be used in conjunction with the VN800 Motorcycle Service manual (P/N 99924–1183–03). The maintenance and repair procedures described in this supplement are only those that are unique to the VN800Bmotorcycle. Most service operations for these models remain identical to those described in the base Service Manual. Complete and proper servicing of the VN800B motorcycle therefore requires both this supplement and the base Service Manual.

The base Service Manual and this Supplement are designed primarily for use by motorcycle mechanics in a properly equipped shop. However, they contain enough detail and basic information to make them useful to the operator who desires to perform his own basic maintenance and repair work. A basic knowledge of mechanics, the proper use of tools, and work shop procedures must be understood in order to carry out maintenance and repair satisfactorily. Whenever the operator has insufficient experience or doubts his ability to do the work, the adjustments, maintenance, and repair should be carried out only by qualified mechanics.

In order to perform the work efficiently and to avoid costly mistakes, the mechanic should read the text, thoroughly familiarize yourself with the procedures before starting work, and then do the work carefully in a clean area. Whenever special tools and equipment are specified, makeshift tools or equipment should not be used. Precision measurements can only be made if the proper instruments are used, and the use of substitute tools may adversely affect safe operation of the motorcycle.

How to Use This Manual

In preparing this manual, we divided the product into its major systems. These systems became the manual's chapters. All information for a particular system from adjustment through disassembly and inspection is located in a single chapter.

The Quick Reference Guide shows you all of the product's system and assists in locating their chapters. Each chapter in turn has its own comprehensive Table of Contents.

The Periodic Maintenance Chart is located in the General Information chapter. The chart gives a time schedule for required maintenance operations.

If you want spark plug information, for example, go to the Periodic Maintenance Chart first. The chart tells you how frequently to clean and gap the plug. Next, use the Quick Reference Guide to locate the Electrical System chapter. Then, use the Table of Contents on the first page of the chapter to find the Spark Plug section. Whenever you see these WARNING and CAUTION symbols, heed their instructions!

Always follow safe operating and maintenance practices.

⚠WARNING

This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.

CAUTION

This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

This manual contains five more symbols (in addition to WARNING and CAUTION) which will help you distinguish different types of information.

NOTE

○ *This note symbol indicates points of particular interest for more efficient and convenient operation.*

● Indicates a procedural step or work to be done.

○ Indicates a procedural sub-step or how to do the work of the procedural step it follows. It also precedes the text of a WARNING, CAUTION or NOTE.

★ Indicates a conditional step or what action to take based on the results of the test or inspection in the procedural step or sub-step it follows.

★ Indicates a conditional sub-setp or what action to take based upon the results of the conditional step it follows.

In most chapters an exploded view illustration of the system components follows the Table of Contents. In these illustrations you will find the instructions indicating which parts require specified tightening torque, oil, grease or a locking agent during assembly.

General Information

Table of Contents

Model Identification

VN800–B1 (US and Canadian Models) Left Side View:



VN800–B1 (European Models) Left Side View:



Model Identification

General Specifications

Items		VN800-B1,B2,B3,B4
Dimensions:		
Overall length		2 390 mm, (CN) (US) (ML)2 375 mm
Overall width		940 mm, (CN) (US) (ML) 930 mm
Overall height		1 125 mm, (CN) (US) (ML) 1 130 mm
Wheelbase		1 600 mm
Road clearance		135 mm
Seat height		705 mm
Dry mass		235 kg, (CN) (US) (ML) 234 kg, (CA) 234.5 kg
Curb mass:	Front	116 kg, (CN) (US) (ML) 115 kg
	Rear	138 kg, (CA) 138.5 kg
Fuel tank capacity		15.0 L
Performance:		
Minimum turning radius		2.9 m
Engine:		
Type		4-stroke, SOHC, V2-cylinder
Cooling system		Liquid-cooled
Bore and stroke		88.0 × 66.2 mm
Displacement		805 mL
Compression ratio		9.5 : 1
Maximum horsepower		40.5 kW (55 PS) @7 000 r/min (rpm), (CN) (ML) 44.1 kW (60 PS) @ 7 500 r/min (rpm), (ST) 24.2 kW (33 PS) @ 6 000 R/min (rpm), (FR) 39.3 kW (53 PS) @ 7 000 r/min (rpm) (UTAC's norm), (US) - - -
Maximum torque		64 N·m (6.5 kgf·m, 47.0 ft·lb) @3 300 r/min (rpm) , (CN) (ML) 64.7 N·m (6.6 kg ,47.7 ft·lb @ 3 500 r/min (rpm), (ST) 55 N·m (5.6 kg·m, 40.5 ft·lb) @3 000 r/min (rpm) , (FR) (UK) (US) - - -
Carburetion system		Carburetor, Keihin CVK36
Starting system		Electric starter
Ignition system		Battery and coil (transistorized)
Timing advance		Electronically advanced (digital igniter)
Ignition timing		From 5.0° BTDC @1 000 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm)
Spark plug		NGK CR7E or ND U22ESR-N
Cylinder numbering method		Front to rear, 1-2
Firing order		2-1
Valve timing:		
Inlet	Open	19° BTDC
	Close	71° ABDC
	Duration	270°
Exhaust	Open	69° BBDC
	Close	31° ATDC
	Duration	280°
Lubrication system		Forced lubrication (wet sump)
Engine oil:	Grade	SE, SF or SG class
	Viscosity	SAE10W-40, 10W-50, 20W-40, or 20W-50
	Capacity	3.2 L

General Specifications

Items		VN800-B1, B2, B3, B4
Drive Train:		
Primary reduction system:		
Type		Gear
Reduction ratio		2.184 (83/38)
Clutch type		Wet multi disc
Transmission:		
Type		5-speed, constant mesh, return shift
Gear ratios:	1st	2.533 (38/15)
	2nd	1.650 (33/20)
	3rd	1.230 (32/26)
	4th	1.000 (29/29)
	5th	0.857 (24/28)
Final drive system:		
Type		Chain drive
Reduction ratio		2.470 (42/17)
Overall drive ratio		4.625 @Top gear
Frame:		
Type		Tubular, double cradle
Caster (rake angle)		32°
Trail		122 mm
Front tire:	Type	Tube
	Size	130/90-16 67H
Rear tire:	Type	Tube
	Size	140/90-16 71H
Front suspension:	Type	Telescopic fork
	Wheel travel	150 mm
Rear suspension:	Type	Swingarm (uni-trak)
	Wheel travel	100 mm
Brake Type:	Front	Single disc
	Rear	Drum
Electrical Equipment:		
Battery		12 V 12 Ah
Headlight:	Type	Semi-sealed beam
	Bulb	12 V 60/55 W (quartz-halogen)
Tail/brake light		12 V 5/21 W × 2, (CN) (US) (ML) 12 V 8/27 W × 2
Alternator:	Type	Three-phase AC
	Rated output	23.5 A × 14 V @8 000 r/min (rpm)

Specifications are subject to change without notice, and may not apply to every country.

(CA) : California Model
(CN) : Canadian Model
(FR) : French Model
(ML) : Malaysian Model
(ST) : Switzerland Model
(UK) : U.K Model
(US) : U.S. Model

Periodic Maintenance Chart (US and Canada)

The scheduled maintenance must be done in accordance with this chart to keep the motorcycle in good running condition. **The initial maintenance is vitally important and must not be neglected.**

FREQUENCY / OPERATION	Whichever comes first → ↓ Every	† ODOMETER READING 800 km (500 mile)	5 000 km (3 000 mile)	10 000 km (6 000 mile)	15 000 km (9 000 mile)	20 000 km (12 000 mile)	25 000 km (15 000 mile)	30 000 km (18 000 mile)
Spark plug - clean and gap†			●	●	●	●	●	●
Valve clearance - check * †		●		●		●		●
Air suction valve - check *			●	●	●	●	●	●
Air cleaner element - clean * †		●		●		●		●
Throttle grip play - check * †		●		●		●		●
Idle speed - adjust *		●	●	●	●	●	●	●
Fuel system - check *				●		●		●
Evaporative emission control system (c) - check †		●	●	●	●	●	●	●
Fuel hoses, connections - check†			●	●	●	●	●	●
Coolant - change	2 years							●
Engine oil - change *	year	●	●	●	●	●	●	●
Oil filter - replace		●		●		●		●
Oil screen - clean		●		●		●		●
Radiator hoses, connections - check * †	year	●		●		●		●
Fuel hose - replace	4 years							
Clutch - adjust		●	●	●	●	●	●	●
Drive chain wear - check *# †		●	●	●	●	●	●	●
Drive chain - lubricate #	600 km							
Drive chain slack - check *# †	1000 km							
Brake lining or pad wear - check * †			●	●	●	●	●	●
Brake fluid level - check * †	month	●	●	●	●	●	●	●
Brake fluid - change	2 years					●		
Brake hose - replace	4 years							
Brake hoses, connections - check †			●	●	●	●	●	●
Brake master cylinder cup and dust seal - replace	2 years							
Caliper piston seal and dust seal - replace	2 years							
Brake Play - check * †		●	●	●	●	●	●	●
Brake light switch - check * †		●	●	●	●	●	●	●
Brake cable - replace	2 years					●		
Steering - check * †		●	●	●	●	●	●	●
Steering stem bearing - lubricate	years					●		
Front fork oil - change								●
Brake camshaft - lubricate	2 years					●		
Tire wear - check * †			●	●	●	●	●	●
Spoke tightness and rim runout - check * †		●	●	●	●	●	●	●
Swingarm pivot, uni - trak linkage - lubricate				●		●		●
General lubrication - perform			●	●	●	●	●	●
Nuts, bolts, and fasteners tightness - check * †		●		●		●		●

: Service more frequently when operating in severe conditions : dusty, wet, muddy, highspeed, or frequent starting/stopping.

† : For higher odometer readings, repeat at the frequency interval established here.

* : Replace, add, adjust, clean, or torque if necessary.

Periodic Maintenance Chart (Other than US and Canada)

The scheduled maintenance must be done in accordance with this chart to keep the motorcycle in good running condition. **The initial maintenance is vitally important and must not be neglected.**

FREQUENCY / OPERATION	Whichever comes first → ↓ Every	* ODOMETER READING 1 000 km (600 mile)	6 000 km (4 000 mile)	12 000 km (7 500 mile)	18 000 km (12 000 mile)	24 000 km (15 000 mile)	30 000 km (20 000 mile)	36 000 km (24 000 mile)
Spark plug - clean and gap †			●	●	●	●	●	●
Valve clearance check †				●		●		●
Air suction valve - check †			●	●	●	●	●	●
Air cleaner element - clean† #				●		●		●
Throttle grip play - check †		●		●		●		●
Idle speed - adjust		●		●		●		●
Fuel hoses, connections - check †			●	●	●	●	●	●
Engine oil - change #	6 months	●	●	●	●	●	●	●
Oil filter - replace		●		●		●		●
Oil screen - clean		●		●		●		●
Radiator hoses, connections - check †		●						
Coolant - change	2 years					●		
Clutch - adjust		●	●	●	●	●	●	●
Drive chain wear - check † #			●	●	●	●	●	●
Drive chain - lubricate #	600 mm							
Drive chain slack - check † #	1 000 km							
Brake hoses, connections - check †			●	●	●	●	●	●
Brake lining or pad wear - check † #	month		●	●	●	●	●	●
Brake fluid level - check †	month	●	●	●	●	●	●	●
Brake fluid - change	2 years					●		
Brake master cylinder cup and dust seal - replace	4 years							
Caliper piston seal and dust seal - replace	4 years							
Brake play - check †		●	●	●	●	●	●	●
Brake light switch - check †		●	●	●	●	●	●	●
Brake cable - replace	2 years					●		
Steering - check †		●	●	●	●	●	●	●
Steering stem bearing - lubricate	2 years					●		
Front fork oil - change	2 years					●		
Rear shock absorber oil leak - check †				●		●		●
Front fork oil leak - check †				●		●		●
Tire wear - check †			●	●	●	●	●	●
Spoke tightness and rim runout - check †		●	●	●	●	●	●	●
Swingarm pivot, uni-trak linkage - lubricate				●		●		●
General lubrication - perform				●		●		●
Nuts, bolts, and fastener tightness - check †		●		●		●		●

: Service more frequently when operating in severe conditions; dusty, wet, muddy, high speed, or frequent starting / stopping.

* : For higher odometer readings, repeat at the frequency interval established here.

† : Replace, add, adjust, clean, or torque if necessary.

Torque and Locking Agent

The following tables list the tightening torque for the major fasteners requiring use of a non-permanent locking agent or liquid gasket.

Letters used in the "Remarks" column mean:
- **L:** Apply a non-permanent locking agent to the threads.
- **O:** Apply an oil to the threads, seating surface, or washer.
- **S:** Tighten the fasteners following the specified sequence.
- **SS:** Apply silicone sealant.

Fastener		Torque			Remarks
		N·m	kg·m	ft·lb	
Fuel System:					
Fuel tap mounting bolts		2.5	0.25	22 in·lb	
Carburetor damper plate mounting bolts		11	1.1	95 in·lb	
Air cleaner element cover mounting nut		11	1.1	95 in·lb	
Air cleaner housing mounting bolts		11	1.1	95 in·lb	
Cooling System:					
Water pump impeller nut		11	1.1	95 in·lb	
Water hose fitting bolts		11	1.1	95 in·lb	
Radiator fan switch		18	1.8	13.0	SS
Water temperature sensor		7.8	0.80	69 in·lb	SS
Coolant drain plug		11	1.1	95 in·lb	
Engine Top End:					
Cylinder head cover bolts		12	1.2	104 in·lb	
Cylinder head nuts:	10 mm	39	4.0	29	S
	8 mm	25	2.5	18.0	S
Cylinder head bolts		12	1.2	104 in·lb	S
Cylinder nuts		25	2.5	18.0	
Camshaft cap bolts		25	2.5	18.0	
Camshaft sprocket bolts		49	5.0	36	L
Camshaft chain tensioner cap bolts		20	2.0	14.5	
Camshaft chain guide bolts		11	1.1	95 in·lb	L
Intake manifold bolts		12	1.2	104 in·lb	
Cylinder head cover damper plate bolts		7.8	0.8	69 in·lb	L,S
Clutch:					
Clutch hub nut		130	13.5	98	O
Clutch spring bolts		8.8	0.90	78 in·lb	
Right engine cover bolts		12	1.2	104 in·lb	L (1)
Engine Lubrication System:					
Engine drain plug		20	2.0	14.5	
Oil pump mounting bolts		11	1.1	95 in·lb	L
Oil pump drive chain guide bolt		12	1.2	104 in·lb	L
Oil filter		18	1.8	13.0	
Oil filter plate mounting bolts		7.8	0.80	69 in·lb	
Oil screen plug		20	2.0	14.5	
Oil pressure relief valve		15	1.5	11.0	L
Oil pressure switch		15	1.5	11.0	SS
Oil pressure switch adapter		20	2.0	14.5	
Oil pipe mounting bolts (crankcase inside)		11	1.1	95 in·lb	L
Oil pipe mounting bolts (crankcase outside)		5.4	0.55	48 in·lb	L
Oil passage cover screws (crankcase outside)		5.4	0.55	48 in·lb	L
Engine Removal/Installation:					
Engine mounting nuts		44	4.5	33	

Torque and Locking Agent

Fastener		Torque N·m	kg·m	ft·lb	Remarks
Engine mounting bracket bolts		23	2.3	16.5	
Down tube mounting bolts		44	4.5	33	
Crankshaft/Transmission:					
Crankcase bolts	10 mm	39	4.0	29	S
	6 mm	11	1.1	95 in·lb	
Connecting rod big end cap nuts		46	4.7	34	
Primary gear bolt		155	16.0	115	O
Balancer gear bolt		69	7.0	51	L
Starter clutch gear bolt		69	7.0	51	L
Starter clutch bolts		34	3.5	25	L
Output shaft bearing stopper bolts		12	1.2	104 in·lb	
Balancer shaft bearing stopper bolts		11	1.1	95 in·lb	
Shift drum bearing stopper bolts		11	1.1	95 in·lb	
Transmission cover bolts		11	1.1	95 in·lb	
External shift mechanism cover bolts		11	1.1	95 in·lb	
Shift shaft return spring pin		29	3.0	22	L
Shift drum position lever bolt		11	1.1	95 in·lb	
Neutral switch		15	1.5	11.0	
Shift pedal pivot bolt		29	3.0	22	
Shift pedal pivot nut		29	3.0	22	
Shift drum cam mounting screw		-	-	-	L
Shift lever clamp bolt		12	1.2	104 in·lb	
Wheels/Tires:					
Front axle clamp bolt		34	3.5	25	
Front axle nut		110	11.0	80	
Rear axle nut		98	10.0	72	
Spoke nipples		4.0	0.41	36 in·lb	
Final Drive:					
Engine sprocket nut		125	13.0	94	O
Rear sprocket nuts		74	7.5	54	
Rear sprocket stud bolts		-	-	-	L
Brakes:					
Torque link nuts		34	3.5	25	
Caliper mounting bolts		34	3.5	25	
Disc mounting bolts		23	2.3	16.5	
Brake hose banjo bolts		25	2.5	18.0	
Bleed valve		7.8	0.80	69 in·lb	
Brake pedal bolt		23	2.3	16.5	
Master cylinder clamp bolts		11	1.1	95 in·lb	
Brake lever pivot bolt		1.0	0.10	9 in·lb	
Brake lever pivot nut		5.9	0.60	52 in·lb	
Reservoir cap screws		1.5	0.15	13 in·lb	
Front brake light switch screws		1.2	0.12	10 in·lb	
Suspension:					
Front fork clamp bolts:	upper	20	2.0	14.5	
	lower	34	3.5	25	
Front fork bottom Allen bolts		20	2.0	14.5	L
Rear shock absorber nuts		59	6.0	43	
Swingarm pivot shaft nut		98	10.0	72	
Rocker arm pivot shaft nut		98	10.0	72	
Tie-rod nuts		59	6.0	43	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kg·m	ft·lb	
Steering:				
Handlebar clamp bolts	34	3.5	25	
Handle holder mounting nuts	34	3.5	25	
Handlebar weight mounting screws	–	–	–	L
Steering stem head bolt	44	4.5	33	
Steering stem nut	4.9	0.50	43 in·lb	
Frame:				
Side stand pivot bolt	44	4.5	33	
Rear frame mounting bolts	44	4.5	33	
Helmet hook mounting screw	-	-	-	L
Electrical System:				
Alternator cover bolts	12	1.2	104 in·lb	L (1)
Timing inspection cover screw	4.9	0.50	43 in·lb	
Alternator rotor bolt	155	16.0	115	O
Stator coil bolts	13	1.3	113 in·lb	
Pickup coil bolts	2.9	0.30	26 in·lb	
Alternator lead clamp bolts	7.8	0.80	69 in·lb	
Spark plugs	18	1.8	13.0	
Starter motor mounting bolts	11	1.1	95 in·lb	
Starter motor through bolts	4.9	0.50	43 in·lb	
Starter motor terminal nut	11	1.1	95 in·lb	
Starter motor cable nuts	4.9	0.50	43 in·lb	
Side stand switch mounting bolt	3.9	0.40	35 in·lb	L

The table below, relating tightening torque to thread diameter, lists the basic torque for the bolts and nuts. Use this table for only the bolts and nuts which do not require a specific torque value. All of the values are for use with dry solvent-cleaned threads.

Basic Torque for General Fasteners

Threads dia. (mm)	Torque		
	N·m	kg·m	ft·lb
5	3.4 ~ 4.9	0.35 ~ 0.50	30 ~ 43 in·lb
6	5.9 ~ 7.8	0.60 ~ 0.80	52 ~ 69 in·lb
8	14 ~19	1.4 ~1.9	10.0 ~ 13.5
10	25 ~ 34	2.6 ~ 3.5	19.0 ~ 25
12	44 ~ 61	4.5 ~ 6.2	33 ~ 45
14	73 ~ 98	7.4 ~ 10.0	54 ~ 72
16	115 ~ 155	11.5 ~ 16.0	83 ~ 115
18	165 ~ 225	17.0 ~ 23.0	125 ~ 165
20	225 ~ 325	23 ~ 33	165 ~ 240

Wheels / Tires

Table of Contents

Specifications

Item		Standard	Service Limit
Wheels (Rims) :			
Rim runout:	Radial	1.0 mm	2.0 mm
	Axial	0.8 mm	2.0 mm
Axle runout/100 mm		less than 0.1 mm	0.2 mm
Wheel balance		less than 10 g	- - -
Balance weights		10 g, 20 g, 30 g	- - -
Tires:			
Air pressure (when cold):			
Front:	Up to 181 kg (399 lb) load	200 kPa (2.00 kg/cm² 28 psi)	- - -
Rear:	Up to 97.5 kg (215 lb) load	200 kPa (2.00 kg/cm² 28 psi)	- - -
	Over 97.5 kg (215 lb) load	225 kPa (2.25 kg/cm² 32 psi)	- - -
Tread depth:			
	Front	4.3 mm	1 mm
	Rear	7.7 mm	Up to 130 km/h (80 mph): 2 mm Over 130 km/h (80 mph): 3 mm

Make	Type	Size
BRIDGESTONE	EXEDRA G703	130/90 - 16 67H
	EXEDRA G702	140/90 - 16 71H
DUNLOP	D404F	130/90 - 16 67H
	D404	140/90 - 16 71H
Metzeler	MARATHON Front	130/90 - 16 67H
	HMARATHON ME 88	140/90 - 16 71H
	MARATHON Front	130/90 - 16 67 H
	MARATHON ML 2 Plus	140/90 - 16 77 H
	ML 2 Plus Front	130/90 - 16 73 H
	MARATHON ML 2 Plus	140/90 B16 77 H
PIRELLI	MT66 Front	130/90 - 16 M/C 67 H
	MT66	140/90 - 16 M/C 71 H

⚠WARNING

Use the same manufacturer's tires on both front and rear wheels.

Final Drive

Table of Contents

Specifications

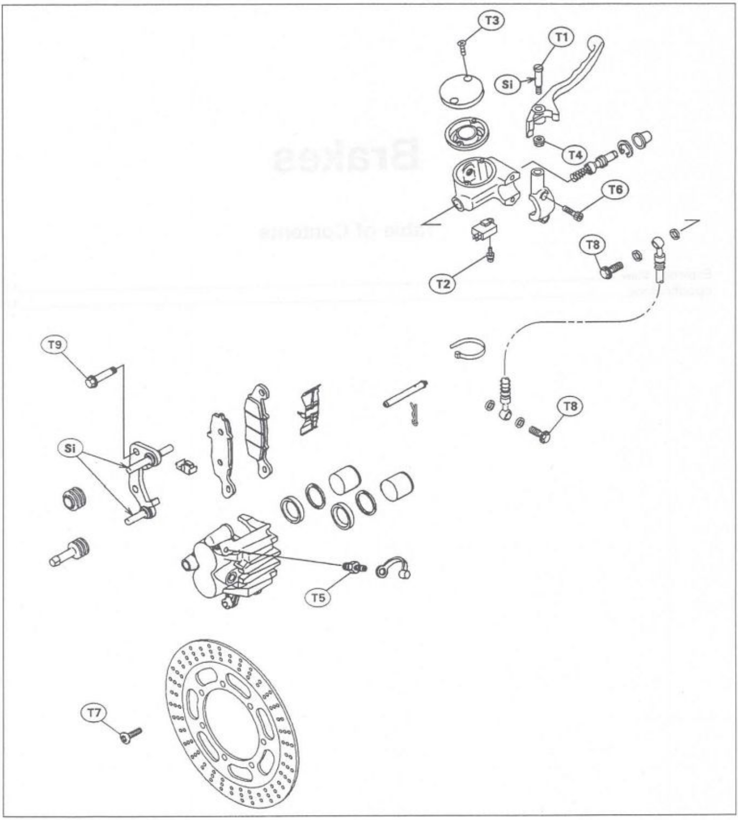
Item		Standard	Service Limit
Drive Chain :			
Chain slack		25 ~ 30 mm	
20-link length		317.5 ~ 318.2 mm	323 mm
Standard chain			
	Make	Enuma	- - -
	Type	EK50MV-O, Endless	- - -
	Link	112 links	- - -
Sprockets :			
Engine sprocket diameter		75.61 ~ 75.87 mm	70.3 mm
Rear sprocket diameter		202.32 ~ 202.82 mm	202.0 mm
Rear sprocket warp		Less-than 0.4 mm	0.5 mm

Special Tools - Inside Circlip Pliers : 57001–143
Bearing Driver Set : 57001–1129

Brakes

Table of Contents

Exploded View



Si: Apply silicone grease.
T1: 1.0 N·m (0.10 kg·m, 9 in·lb)
T2: 1.2 N·m (0.12 kg·m, 10 in·lb)
T3: 1.5 N·m (0.15 kg·m, 13 in·lb)
T4: 5.9 N·m (0.60 kg·m, 52 in·lb)
T5: 7.8 N·m (0.80 kg·m, 69 in·lb)
T6: 11 N·m (1.1 kg·m, 95 in·lb)
T7: 23 N·m (2.3 kg·m, 16.5 ft·lb)
T8: 25 N·m (2.5 kg·m, 18.0 ft·lb)
T9: 34 N·m (3.5 kg·m, 25 ft·lb)

Specifications

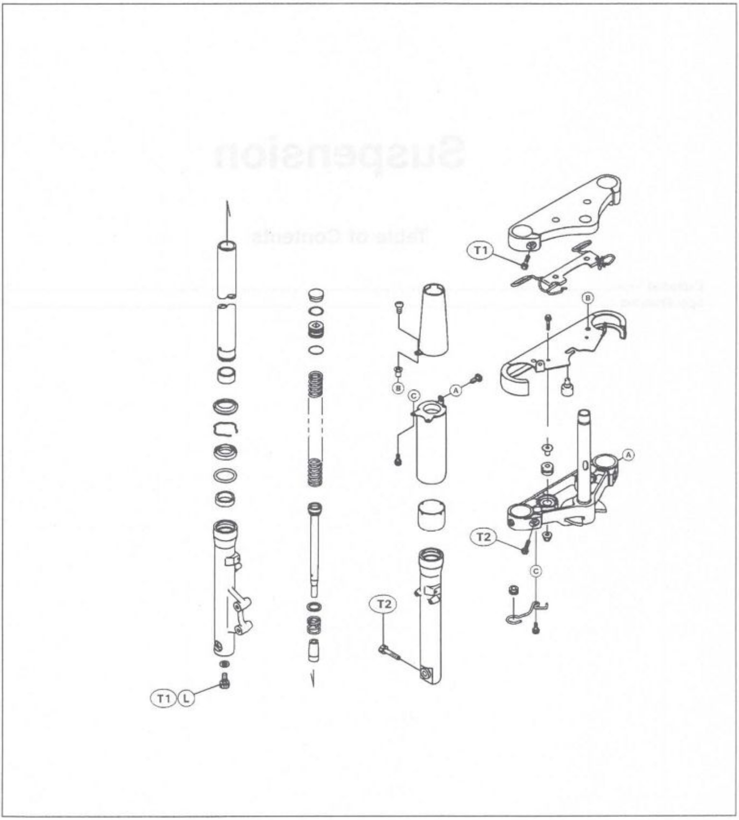
Item	Standard	Service Limit
Front Brake:		
Brake pads lining thickness	4.5 mm	1 mm
Brake disc thickness	5.8~6.2	5.5 mm
Brake disk runout	Less than 0.15 mm	0.3 mm
Brake fluid:		
Grade	DOT 4	- - -
Rear Brake:		
Pedal position	about 65 mm above footpeg top	- - -
Pedal free play	20 ~ 30 mm	- - -
Cam lever angle	80 ~ 90°	- - -
Drum inside diameter	180.00 ~ 180.16 mm	180.75 mm
Shoe lining thickness	4.9 ~ 5.5 mm	2.6 mm
Camshaft diameter	16.957 ~ 16.984 mm	16.88 mm
Camshaft diameter	17.000 ~ 17.070 mm	17.15 mm

Special Tools - Inside Circlip Pliers : 57001–143
Jack : 57001–1238

Suspension

Table of Contents

Exploded View



L: Apply non-permanent locking agent.

T1: 20 N·m (2.0 kg·m, 14.5 ft·lb)

T2: 34 N·m (3.5 kg·m, 25 ft·lb)

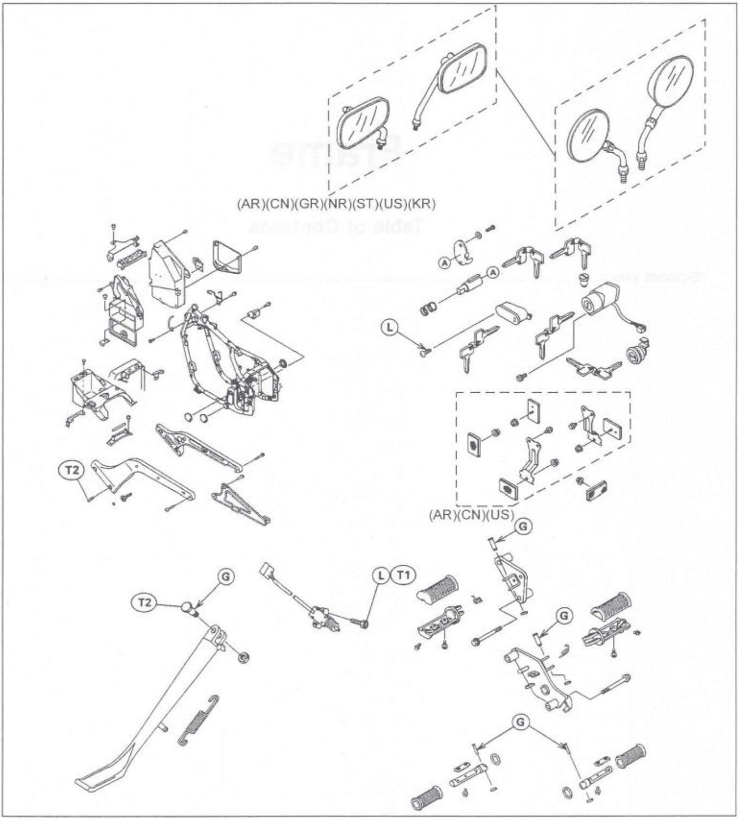
Specifications

Item	Standard	Service Limit
Front Fork:		
Fork oil:		
Viscosity	SAE 10W	
Amount (per side):		
When changing oil	Approx. 265 mL	- - -
After disassembly and completely dry	310 ± 4 mL	- - -
Oil Level (fully compressed, without spring)	286 ± 2 mm	- - -
Fork spring free length	547.2 mm	540 mm
Rear Shock Absorber:		(Adjustable Range)
Spring preload	1st step	1st ~ 7th steps

Frame

Table of Contents

Exploded View



G: Apply grease.
L: Apply non-permanent Locking agent.
T1: 3.9 N·m (0.40 kg·m 35 ft·lb)
T2: 44 N·m (4.5 kg·m 33 ft·lb)

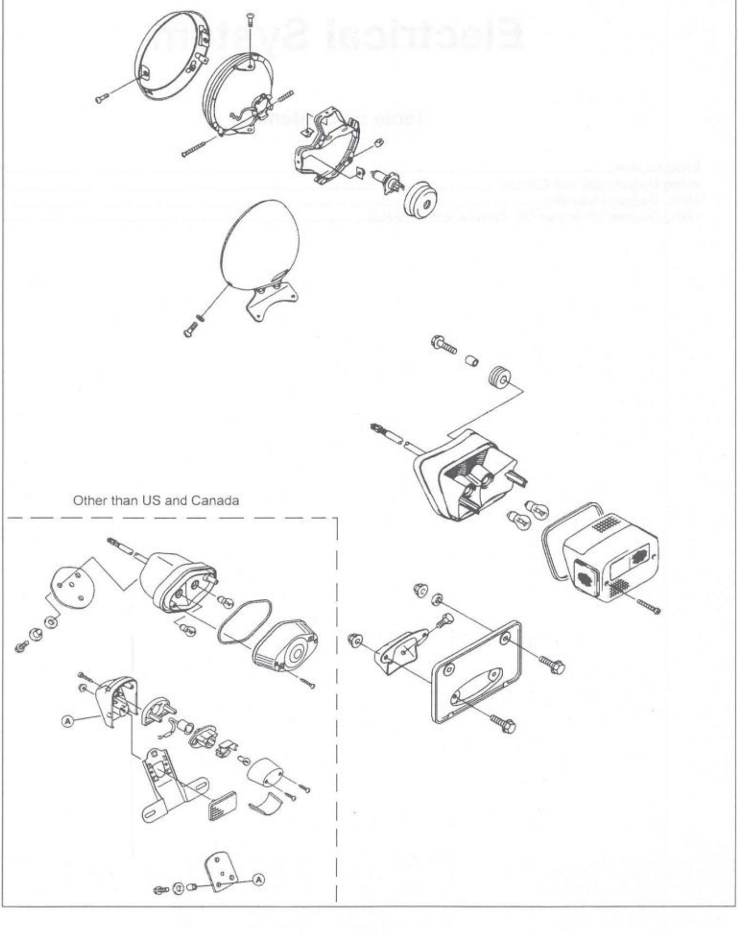
AR: Austria Model
CN: Canada Model
GR: Greece Model
IT: Italy Model
NR: Norway Model
ST: Switzerland Model
US: U.S.A. Model
KR: Korean Model

Electrical System

Table of Contents

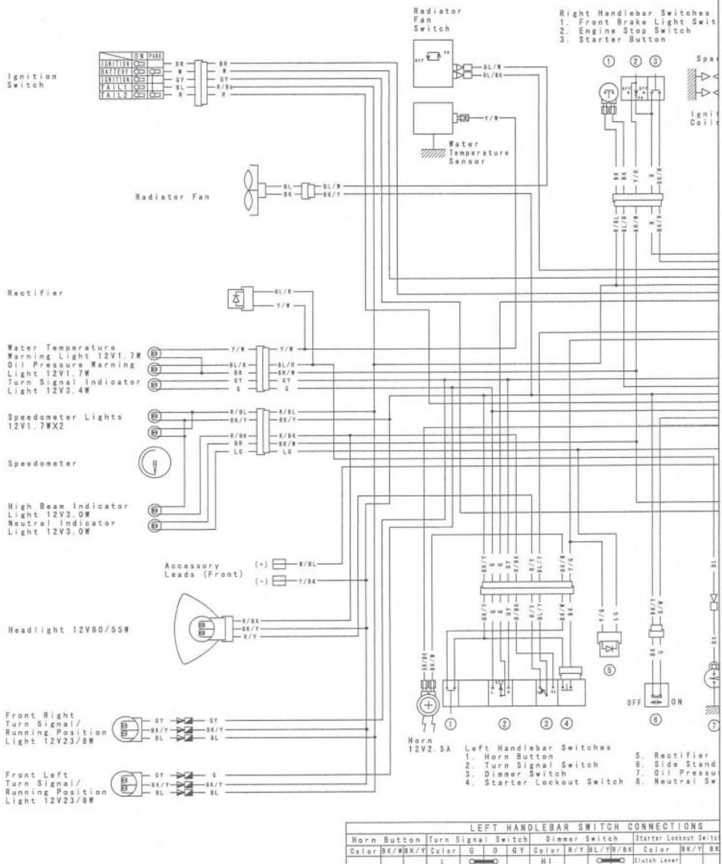
Exploded view

Refer to the base manual, noting the following.



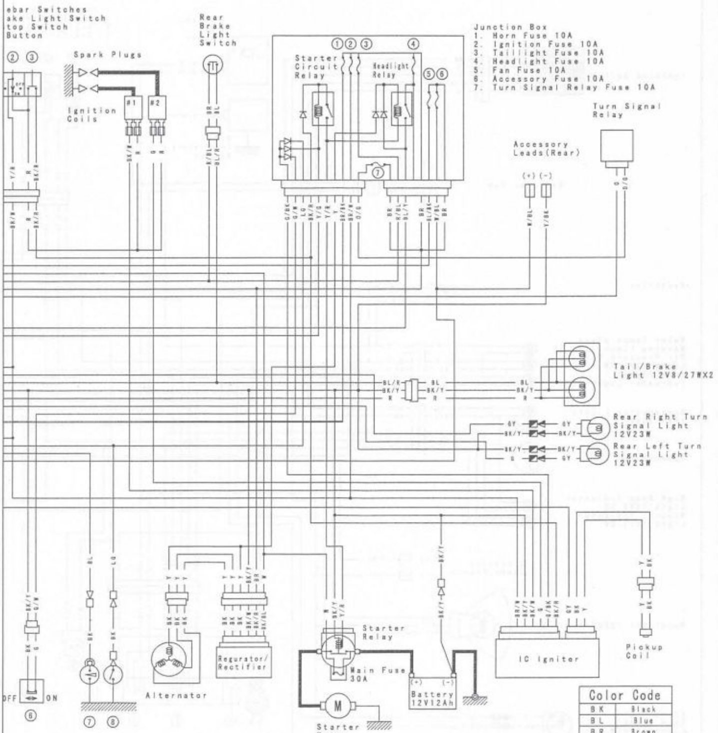
Exploded view

Wiring Diagram (US and Canada)



LEFT HANDLEBAR SWITCH CONNECTIONS													
Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switc		
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK
			L	O	O		HI		O	O	Clutch Lever		
Push	O	O	OFF (Push)								Released		
			R		O	O	LO	O	O		Pulled in	O	O

Wiring Diagram (US and Canada)



5. Rectifier
6. Side Stand Switch
7. Oil Pressure Switch
8. Neutral Switch

CONNECTIONS		
Starter Lockout Switch		
Color	BK/Y	BK
Clutch Lever		
Released		
Pulled in	O—	—O

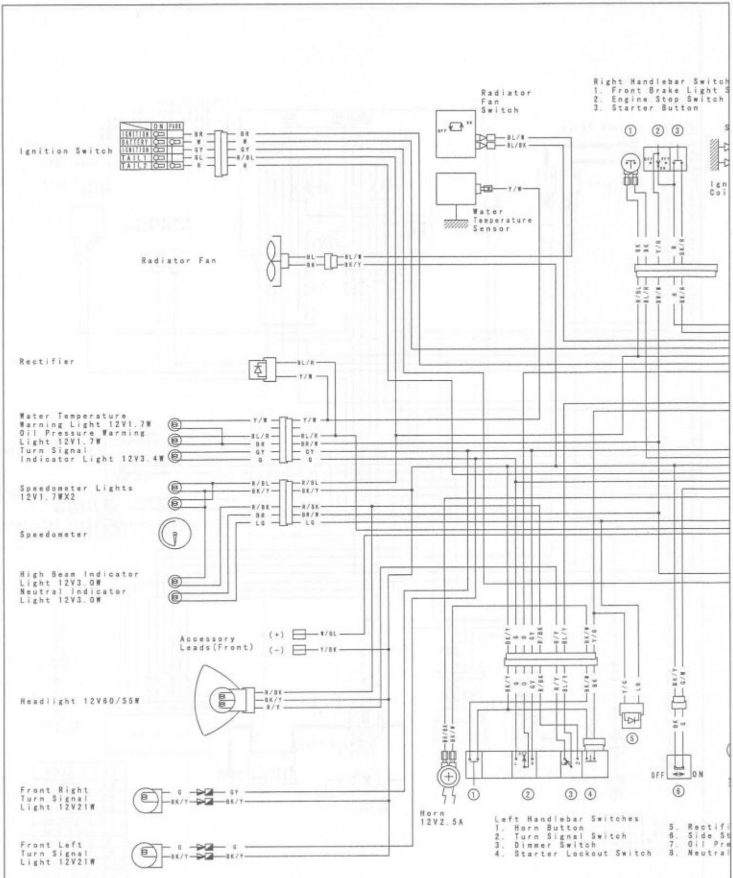
IGNITION SWITCH CONNECTIONS					
	Ignition	Battery	Ignition	Tail1	Tail2
Color	BR	W	GY	BL	R
OFF, LOCK					
ON	O—	—O—	—O	O—	—O
P		O—	—	—	—O

RIGHT HANDLEBAR SWITCH CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	R	BK/R
Brake Lever			OFF					
Pulled in	O—	—O	RUN	O—	—O	Push	O—	—O

Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

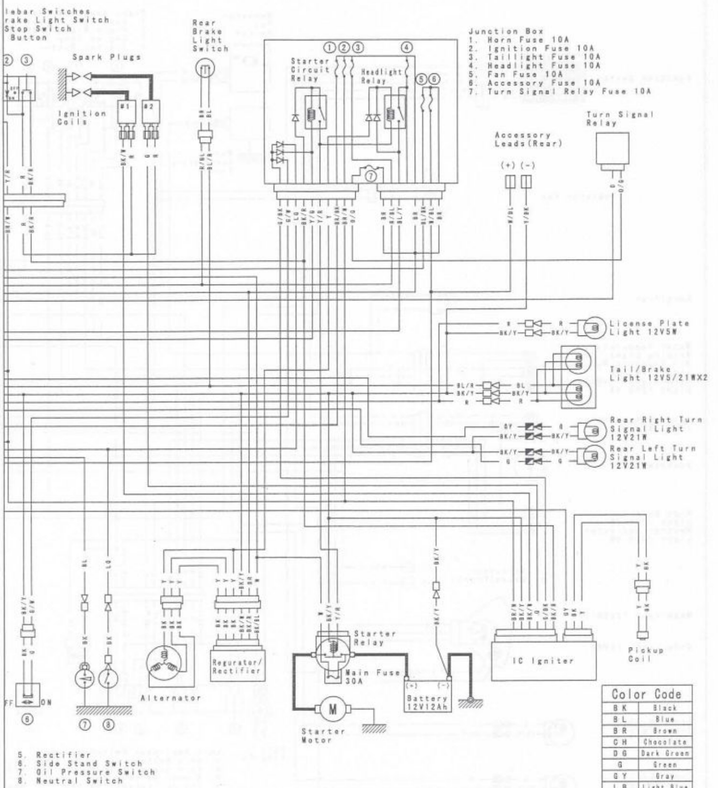
(98051-1592B)C

Wiring Diagram (Australia)



LEFT HANDLEBAR SWITCH CONNECTIONS											
Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lock
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color
			L	○	○		HI		○	○	Clutch Lever
Push	○	○	OFF(Push)								Released
			R		○	○	LO	○	○		Pulled in

Wiring Diagram (Australia)



Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

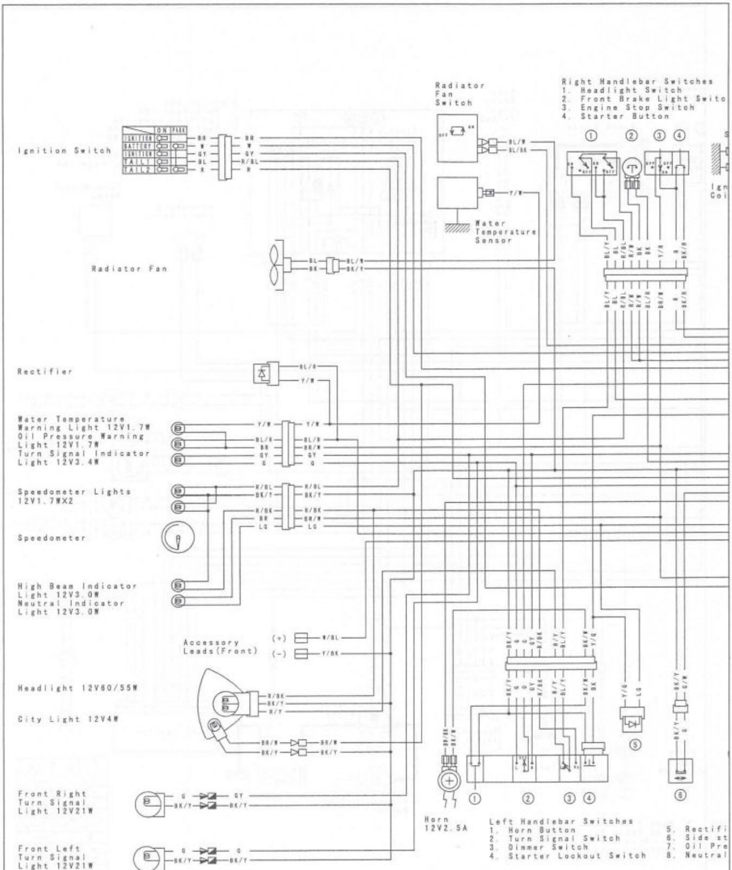
CTIONS				
ch	Starter Lockout Switch			
R/BK	Color	BK/Y	BK	
O—O	Clutch Lever			
	Released			
	Pulled in	O—O		

IGNITION SWITCH CONNECTIONS					
	Ignition	Battery	Ignition	Tail1	Tail2
Color	BR	W	GY	BL	R
OFF, LOCK					
ON	O——	O——	O	O——	O
P (PARK)		O——	——	——	O

RIGHT HANDLEBAR SWITCH CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	R	BK/R
Brake Lever			OFF					
Pulled In	O——	O	RUN	O——	O	Push	O——	O

(98051-1593B)C

Wiring Diagram (other than US, Canada, and Australia)



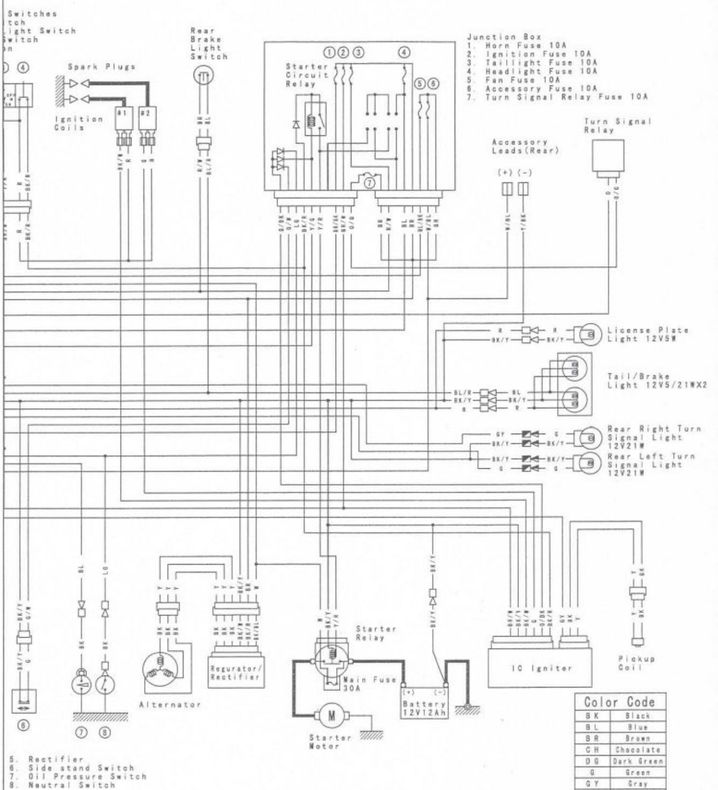
LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switch		
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK
Push	○—	—○	R		○—	—○	LO	○—	—○		Clutch Lever		
Released			OFF (Push)								Released		
			L	○—	—○		HI		○—	—○	Pulled in	○—	—○

IGNITION SW

	Ignition	Ba
Color	BR	
ON	○—	—
P (PARK)		

Wiring Diagram (other than US, Canada, and Australia)



NITION SWITCH CONNECTIONS					
	Ignition	Battery	Ignition	Tail1	Tail2
olor	BR	W	GY	BL	R
ON	○	○	○	○	○
PARK)		○	—	—	○

RIGHT HANDLEBAR SWITCH CONNECTIONS														
Headlight Switch					Front Brake Light Switch			Engine Stop Switch			Starter Button			
Color	R/BL	R/W	BL/Y	BL	Color	BK	BK	Color	R	Y/R	Color	R	BK/R	
OFF					Brake Lever			OFF			Push	○	○	
●	○	○			Pulled In	○	○				Released			
ON	○	○	○	○	Released			RUN	○	○				

Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

(98051-1590B)C

Supplement – 2000 - 2001 Models

Table of Contents

Foreword

How to Use this Manual

This "Supplement – 2000 - 2001 Models" designed to be used in conjunction with the front part of this manual (up to 15-9) and/or Base Manual VN800 Motorcycle Service Manual – Part No. 99924-1183-04. The specifications and maintenance procedures described in this chapter are only those that are unique to the VN800-B5/B6 models.

Complete and proper servicing the VN800-B5/B6 models therefore requires mechanics to read both this chapter and the front of this manual.

General Information

Model Identification

VN800-B5 Left Side View



VN800-B5 Right Side View



General Specifications

Items		VN800-B5/B6
Dimensions:		
Overall length		2380 mm, (CN) (US) (ML) 2375 mm
Overall width		940 mm, (CN) (US) (ML) 930 mm
Overall height		1125 mm, (CN) (US) (ML) 1130 mm
Wheelbase		1600 mm
Road clearance		135 mm
Seat height		705 mm
Dry mass		235 kg, (CN) (US) (ML) 234 kg, (CA) 234.5 kg
Curb mass:	Front	116 kg, (CN) (US) (ML) 115 kg
	Rear	138 kg, (CA) 138.5 kg
Fuel tank capacity		15.0 L
Performance:		
Minimum turning radius		2.9 m
Engine:		
Type		4-stroke, SOHC, V2-cylinder
Cooling system		Liquid-cooled
Bore and stroke		88.0 x 66.2 mm
Displacement		805 mL
Compression ratio		9.5 : 1
Maximum horsepower		40.5 kW (55 PS) @7000 r/min (rpm), (CN) (ML) 44.1 kW (60 PS) @7500 r/min (rpm), (ST) 24.2 kW (33 PS) @6000 r/min (rpm), (FR) 39.3 kW (53 PS) @7000 r/min (rpm) (UTAC's norm), (US) - - -
Maximum torque		64 N-m (6.5 kg-m, 47.0 ft-lb) @3300 r/min (rpm), (CN) (ML) 64.7 N-m (6.6 kg, 47.7 ft-lb) @ 3500 r/min (rpm), (ST) 55 N-m (5.6 kg-m, 40.5 ft-lb9) @ 3000 r/min (rpm), (FR) (UK) (US) - - -
Carburetion system		Carburetor, Keihin CVK36
Starting system		Electric starter
Ignition system		Battery and coil (transistorized)
Timing advance		Electronically advanced (digital igniter)
Ignition timing		From 5.0° BTDC @1000 r/min (rpm) to 37.5° BTDC @6750 r/min (rpm) (CA) From 5.0° BTDC @1300 r/min (rpm) to 37.5° BTDC @6750 r/min (rpm)
Spark plug		NGK CR7E or ND U22ESR-N
Cylinder numbering method		Front to rear, 1-2
Firing order		2-1
Valve timing:		
Inlet	Open	19° BTDC
	Close	71° ABDC
	Duration	270°
Exhaust	Open	69° BBDC
	Close	31° ATDC
	Duration	280°
Lubrication system		Forced lubrication (wet sump)
Engine oil:	Grade	API SE, SF, or SG class, or API SH or SJ with JASO MA
	Viscosity	SAE10W-40, 10W-50, 20W-40, or 20W-50
	Capacity	3.2 L

General Specifications

Items			VN800-B5/B6
Drive Train:			
Primary reduction system:			
Type			Gear
Reduction ratio			2.184 (83/38)
Clutch type			Wet multi disc
Transmission:			
Type			5-speed, constant mesh, return shift
Gear rations:	1st		2.533 (38/15)
	2nd		1.650 (33/20)
	3rd		1.230 (32/26)
	4th		1.000 (29/29)
	5th		0.857 (24/28)
Final drive system:			
Type			Chain drive
Reduction ratio			2.470 (42/17)
Overall drive ratio			4.625 @Top gear
Frame:			
Type			Tubular, double cradle
Caster (rake angle)			32°
Trail			122 mm
Front tire:	Type		Tube
	Size		130/90-16 67H
Rear tire:	Type		Tube
	Size		140/90-16 71H
Front suspension:	Type		Telescopic fork
	Wheel travel		150 mm
Rear suspension:	Type		Swingarm (uni-trak)
	Wheel travel		100 mm
Brake type:	Front		Single disc
	Rear		Drum
Electrical Equipment:			
Battery			12 V 12 Ah
Headlight:	Type		Semi-sealed beam
	Bulb		12V60/55W (quartz-halogen)
Tail/brake light			12V5/21W x 2
Alternator:	Type		Three-phase AC
	Rated output		23.5 A @8000 r/min (rpm), 14V

Specifications subject to change without notice, and may not apply to every country.

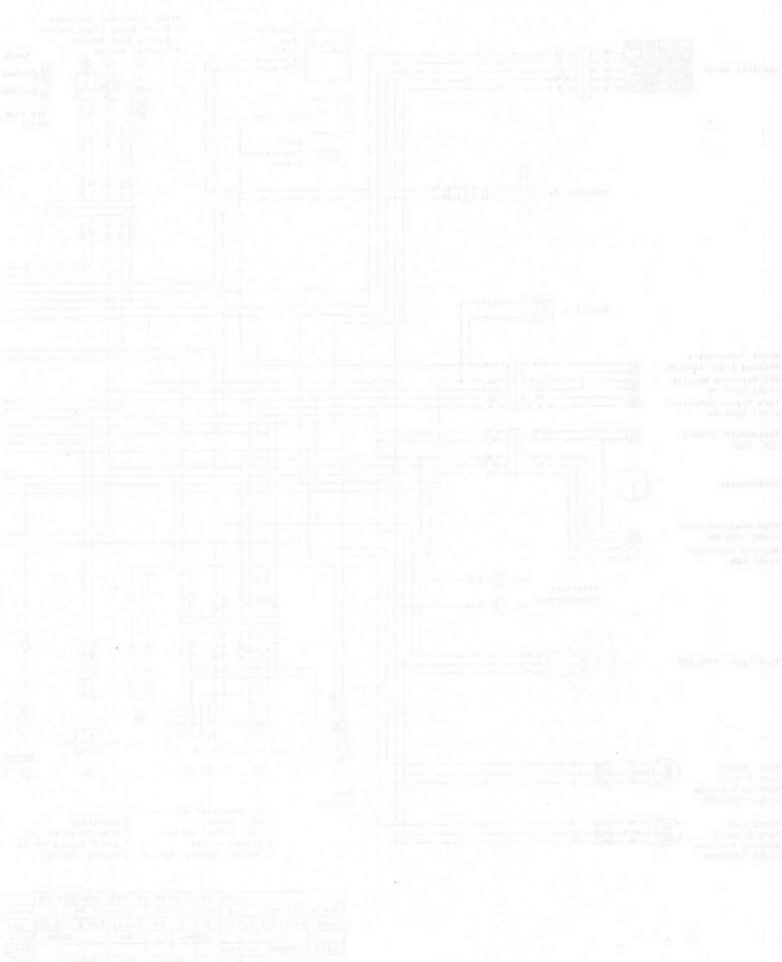
(CA) : California Model
(CN) : Canada Model
(FR) : France Model
(ML) : Malaysia Model
(ST) : Switzerland Model
(UK) : U.K. Model
(US) : U.S.A. Model

Fuel System

Specifications

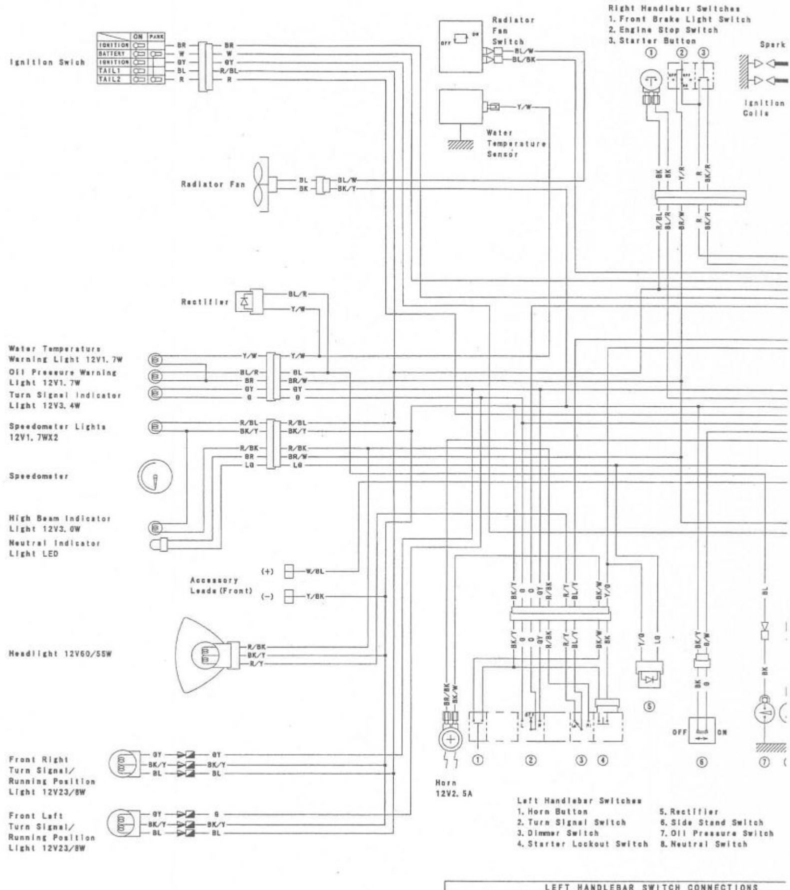
Item	Standard	Service Limit
Throttle Grip and Cables:		
Throttle grip free play	2 ~ 3 mm	—
Carburetor:		
Make, type	KEIHIN, CVK36	—
Idle Speed	1000 ± 50 rpm (CA),(ST) 1300 ± 50 rpm	—
Main jet	#135	—
Main air jet	#100	—
Needle jet	#6	—
Jet needle	N2PE	—
Pilot jet	#48	—
Pilot air jet	#70	—
Pilot screw	1 3/4 turns out	—
Starter jet	#70	—
Service fuel level	2.0 ± 1 mm above upper edge of float chamber	—
Float height	16.5 mm	—
Optional Parts		
Main jet	#130, 132, 138, 140	—

Special Tool – Fuel Level Gauge : 57001-1017
Pilot Screw Adjuster, A : 57001-1239
Carburetor Drain Plug Wrench, Hex 3 : 57001-1269

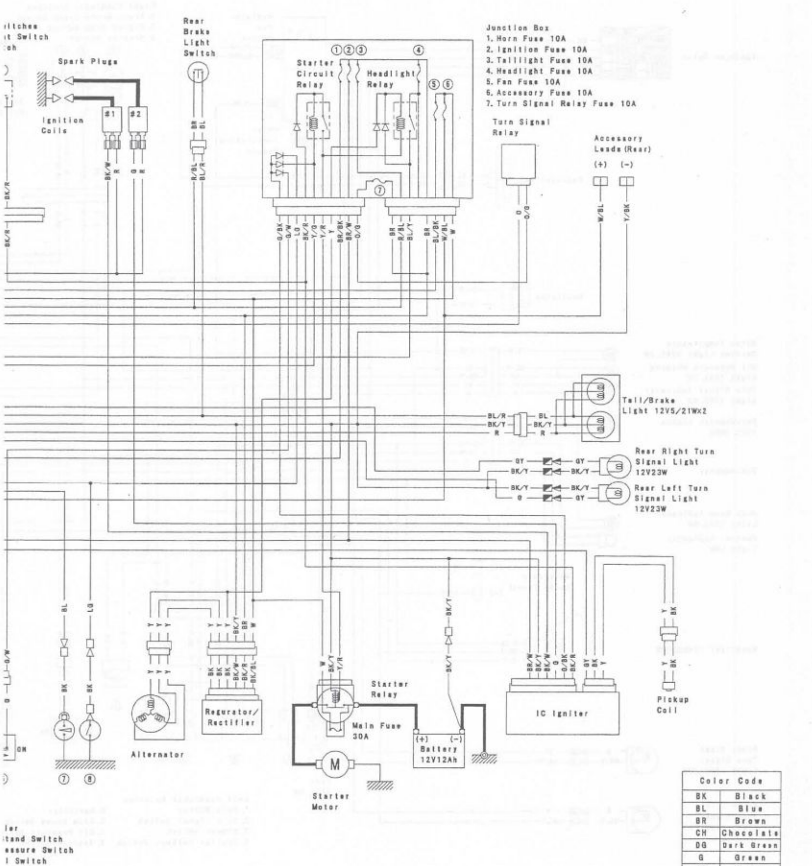


Electrical System

VN800-B5/B6 Wiring Diagram (U.S.A. and Canada)



LEFT HANDLEBAR SWITCH CONNECTIONS											
Horn Button			Turn Signal Switch				Dimmer Switch				Starte
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Col
			L	○	○		HI		○	○	Clutch
Push	○	○	OFF (Push)								Relea
			R		○	○	LO	○	○		Pulle



NNECTIONS					
Switch		Starter Lockout Switch			
BL/Y	R/BK	Color	BK/Y	BK	
○	○	Clutch Lever			
		Released			
○		Pulled in	○	○	

IGNITION SWITCH CONNECTIONS					
	Ignition	Battery	Ignition	Tail1	Tail2
Color	BR	W	GY	BL	R
OFF, LOCK					
ON	○	○	○	○	○
P		○			○

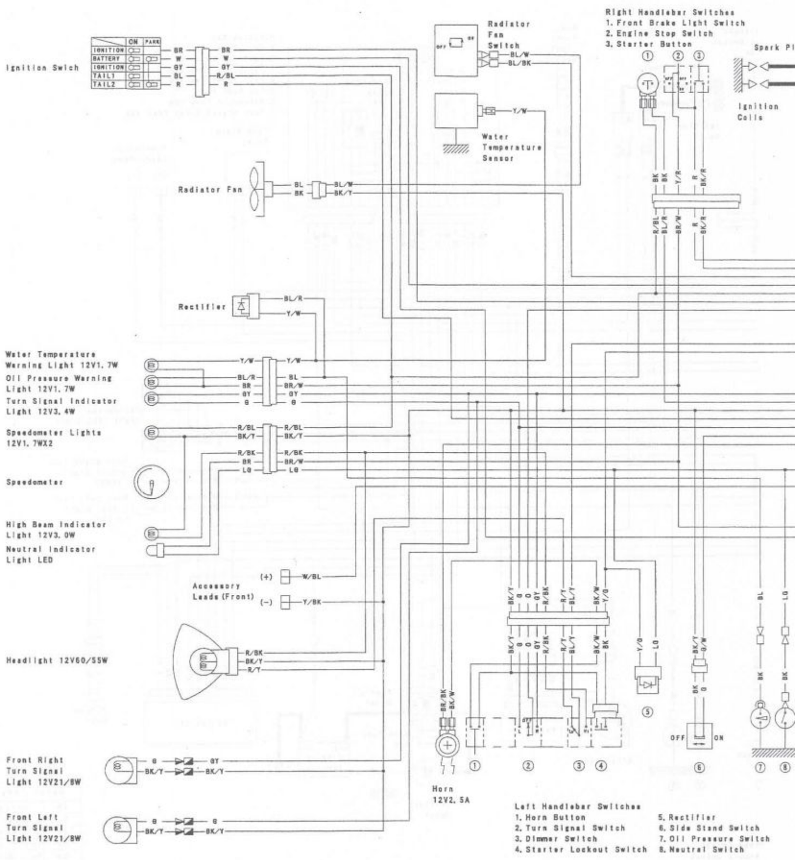
RIGHT HANDLEBAR SWITCH CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	R	BK/R
Brake Lever			OFF					
Pulled in	○	○	RUN	○	○	Push	○	○

(98051-1906B)

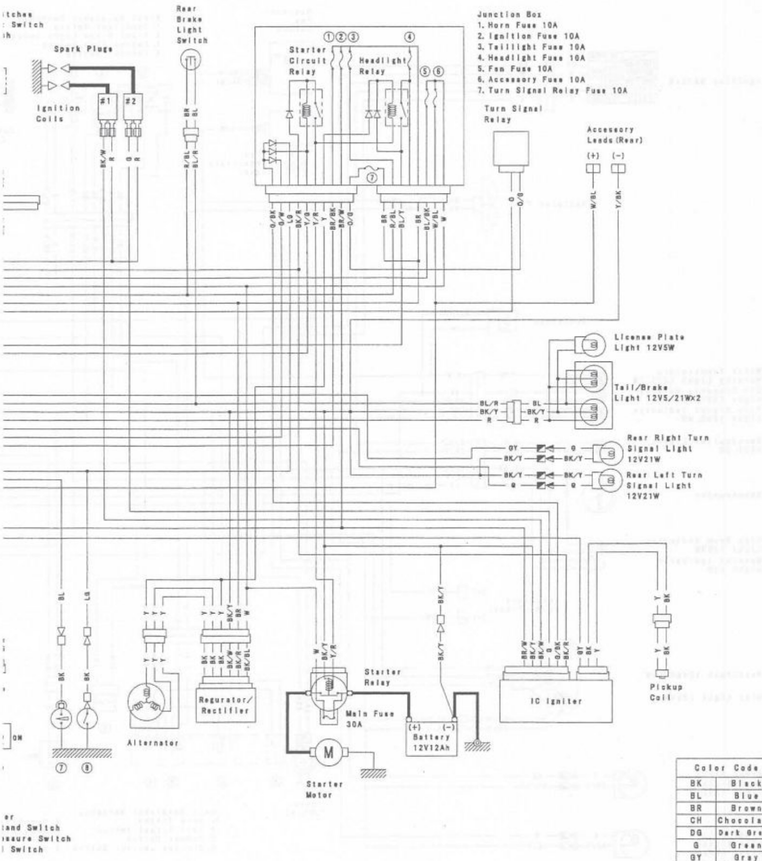
Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

W-VN800B01 C

VN800-B5/B6 Wiring Diagram (Australia)



LEFT HANDLEBAR SWITCH CONNECTIONS											
Horn Button			Turn Signal Switch				Dimmer Switch				Starter L
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color
			L	○—	—○		HI		○—	—○	Clutch Le
Push	○—	—○	OFF (Push)								Release
			R		○—	—○	LO	○—	—○		Pulled



NECTIONS					
Switch		Starter Lockout Switch			
BL/Y	R/BK	Color	BK/Y	BK	
○━━━	━━━○	Clutch Lever			
		Released			
━○		Pulled in	○━━━	━━━○	

IGNITION SWITCH CONNECTIONS					
	Ignition	Battery	Ignition	Tail1	Tail2
Color	BR	W	GY	BL	R
OFF, LOCK					
ON	○━━━	━━━○━━━	━━━○	○━━━	━━━○
P (PARK)		○━━━	━━━━	━━━━	━━━○

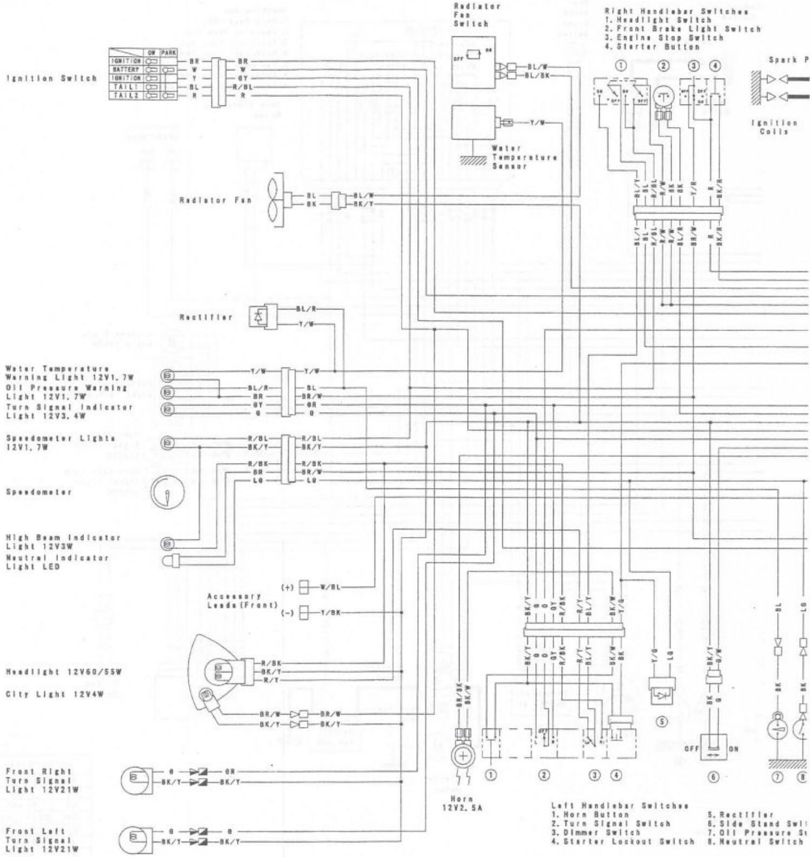
RIGHT HANDLEBAR SWITCH CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	R	BK/R
Brake Lever			OFF					
Pulled in	○━━━	━━━○	RUN	○━━━	━━━○	Push	○━━━	━━━○

(98051-1908B)

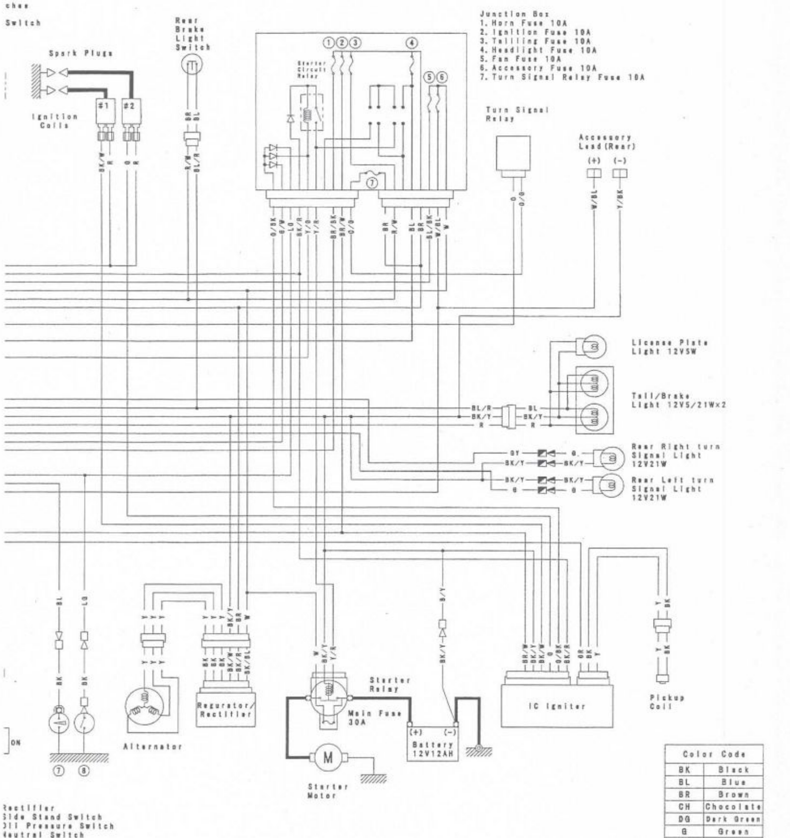
Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

W-VN800B02 C

VN800-B5/B6 Wiring Diagram (Other than U.S.A., Canada and Australia)



LEFT HANDLEBAR SWITCH CONNECTIONS													
Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switch		
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK
Push	○	○	R		○	○	LO	○	○		Clutch Lever		
Released			OFF (Push)								Released		
			L	○	○		HI		○	○	Pulled in	○	○



IGNITION SWITCH CONNECTIONS					
	Ignition	Battery	Ignition	Tail1	Tail2
Color	BR	W	GY	BL	R
ON	○	○	○	○	○
P (PARK)		○			○

RIGHT HANDLEBAR SWITCH CONNECTIONS														
Headlight Switch					Front Brake Light Switch			Engine Stop Switch			Starter Button			
Color	R/BL	R/W	BL/Y	BL	Color	BK	BK	Color	R	Y/R	Color	R	BK/R	
OFF					Brake Lever			OFF			Push	○	○	
●	○	○			Pulled in	○	○				Released			
ON	○	○	○	○	Released			RUN	○	○				

(98051-1907B)

Color Code	
BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

W-VN800B03 C

Supplement – 2002 Model

Table of Contents

Foreword

How to Use this Manual

This "Supplement – 2002 Model" designed to be used in conjunction with the front part of this manual (up to 16-13) and/or Base Manual VN800 Motorcycle Service Manual – Part No. 99924-1183-05. The specifications and maintenance procedures described in this chapter are only those that are unique to the VN800–B7 model.

Complete and proper servicing of the VN800–B7 model therefore requires mechanics to read both this chapter and the front of this manual.

General Information

General Specifications

Items		VN800-B7
Dimensions:		
Overall length		2 380 mm, (CN) (US) 2 375 mm
Overall width		940 mm, (CN) (US) 930 mm
Overall height		1 125 mm, (CN) (US) 1 130 mm
Wheelbase		1 600mm
Road clearance		135 mm
Seat height		705 mm
Dry mass		235 kg, (CN) (US) 234 kg, (CA) 234.5 kg
Curb mass:	Front	116 kg, (CN) (US) 115 kg
	Rear	138 kg, (CA) 138.5 kg
Fuel tank capacity		15.0 L
Performance:		
Minimum turning radius		2.9 m
Engine:		
Type		4-stroke, SOHC, V2-cylinder
Cooling system		Liquid-cooled
Bore and stroke		88.0 × 66.2 mm
Displacement		805 mL
Compression ratio		9.5 : 1
Maximum horsepower		40.5 kW (55 PS) @7 000 r/min (rpm), (CN) 44.1 kW (60 PS) @ 7 500 r/min (rpm), (US) - - -
Maximum torque		64 N·m (6.5 kgf·m, 47.0 ft·lb) @3 300 r/min (rpm) , (CN) 64.7 N·m (6.6 kgf·m ,47.7 ft·lb @ 3 500 r/min (rpm), (UK) (US) - - -
Carburetion system		Carburetor, Keihin CVK36
Starting system		Electric starter
Ignition system		Battery and coil (transistorized)
Timing advance		Electronically advanced (digital igniter)
Ignition timing		From 5.0° BTDC @1 000 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm) (CA) From 5.0° BTDC @1 300 r/min (rpm) to 37.5° BTDC @6 750 r/min (rpm)
Spark plug		NGK CR7E or ND U22ESR-N
Cylinder numbering method		Front to rear, 1-2
Firing order		2-1
Valve timing:		
Inlet	Open	19° BTDC
	Close	71° ABDC
	Duration	270°
Exhaust	Open	69° BBDC
	Close	31° ATDC
	Duration	280°
Lubrication system		Forced lubrication (wet sump)
Engine oil:	Type	API SE, SF, or SG, or API SH or SJ with JASO MA
	Viscosity	SAE10W-40
	Capacity	3.2 L

Items		VN800-B7
Drive Train:		
Primary reduction system:		
Type		Gear
Reduction ratio		2.184 (83/38)
Clutch type		Wet multi disc
Transmission:		
Type		5-speed, constant mesh, return shift
Gear ratios:	1st	2.533 (38/15)
	2nd	1.650 (33/20)
	3rd	1.230 (32/26)
	4th	1.000 (29/29)
	5th	0.857 (24/28)
Final drive system:		
Type		Chain drive
Reduction ratio		2.470 (42/17)
Overall drive ratio		4.625 @Top gear
Frame:		
Type		Tubular, double cradle
Caster (rake angle)		32°
Trail		122 mm
Front tire:	Type	Tube
	Size	130/90-16 67H
Rear tire:	Type	Tube
	Size	140/90-16 71H
Front suspension:	Type	Telescopic fork
	Wheel travel	150 mm
Rear suspension:	Type	Swingarm (uni-trak)
	Wheel travel	100 mm
Brake Type:	Front	Single disc
	Rear	Drum
Electrical Equipment:		
Battery		12 V 12 Ah
Headlight:	Type	Semi-sealed beam
	Bulb	12 V 60/55 W (quartz-halogen)
Tail/brake light		12 V 5/21 W × 2
Alternator:	Type	Three-phase AC
	Rated output	23.5 A @8 000 r/min (rpm), 14 V

Specifications subject to change without notice, and may not apply to every country.

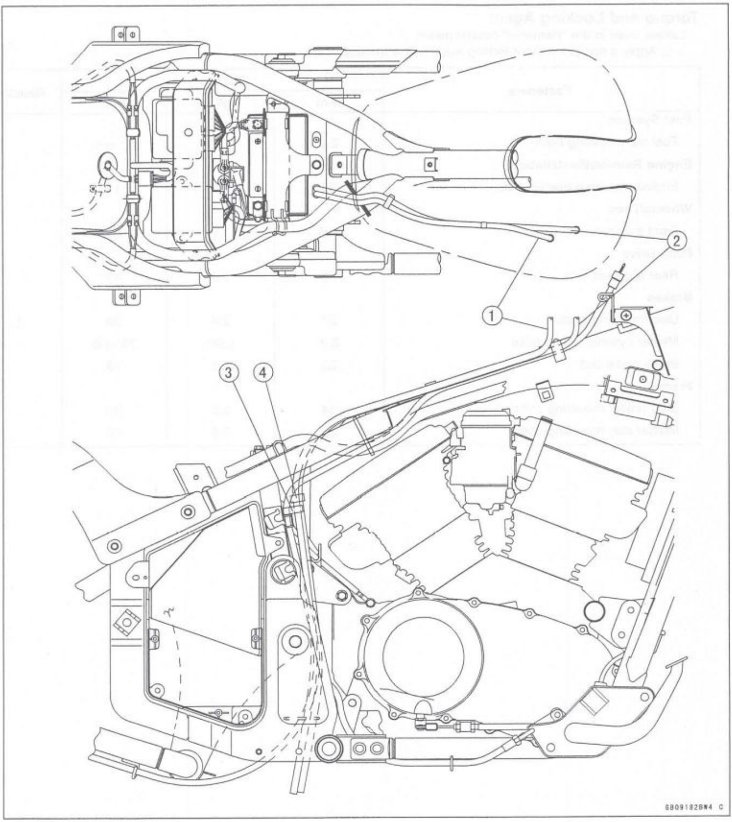
(CA) : California Model
(CN) : Canadian Model
(UK) : U.K. Model
(US) : U.S.A. Model

Torque and Locking Agent

Letters used in the "Remarks" column mean:

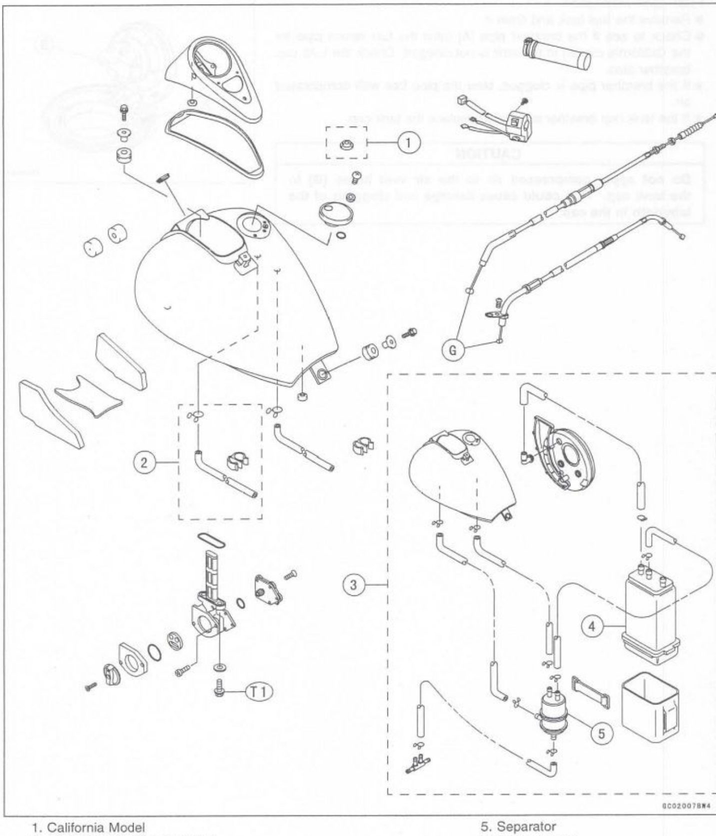
L: Apply a non-permanent locking agent to the threads.

Fasteners	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System:				
Fuel tap mounting bolts	2.5	0.25	22 in·lb	
Engine Removal/Installation				
Engine mounting bracket bolts	25	2.5	18	
Wheels/Tires				
Front axle nut	108	11	80	
Final Drive				
Rear sprocket nuts	59	6.0	43	
Brakes				
Disc mounting bolts	27	2.8	20	L
Master cylinder clamp bolts	8.8	0.90	78 in·lb	
Brake pedal bolt	25	2.6	19	
Frame				
Step holder mounting bolts	34	3.5	25	
Muffler stay mounting bolts	25	2.6	19	



1. Fuel Tank Drain Hose
2. Fuel Tank Breather Hose
3. Clamp (Fuel tank drain and speed meter cable)
4. Clamp (Speed meter cable and breather hose)

Exploded View



1. California Model
2. Other than California Model
3. Evaporative Emission Control System (California Model)
4. Canister
5. Separator

G: Apply grease.

T1: 2.5 N·m (0.25 kgf·m, 22 in·lb)

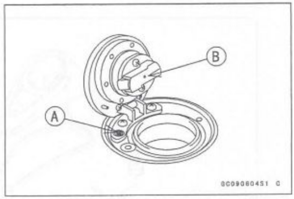
Fuel Tank

Fuel Tank Inspection

- Remove the fuel tank and drain it.
- Check to see if the breather pipe [A] (also the fuel return pipe for the California model) in the tank is not clogged. Check the tank cap breather also.

★ If the breather pipe is clogged, blow the pipe free with compressed air.

★ If the tank cap breather is clogged, replace the tank cap.



CAUTION
Do not apply compressed air to the air vent holes [B] in the tank cap. This could cause damage and clogging of the labyrinth in the cap.

Clutch

Specifications

Item	Standard	Service Limit
Clutch Lever:		
Clutch lever free play	2 ~ 3 mm	– – –
Clutch:		
Friction plate thickness	2.9 ~ 3.1 mm	2.8 mm
Friction and steel plate warp	0.2 mm or less	0.3 mm
Clutch spring free length	35.3 mm	34.1 mm

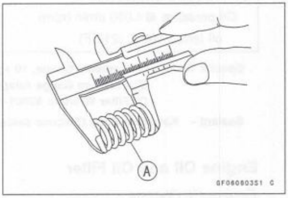
Special Tool - Clutch Holder: 57001–1243

Clutch

Clutch Spring Free Length Measurement

● Measure the free length of the clutch springs [A].

★ If any spring is shorter than the service limit, it must be replaced.



Clutch Spring Free Length

Standard:	**35.3 mm**
Service Limit:	**34.1 mm**

Engine Lubrication System

Specifications

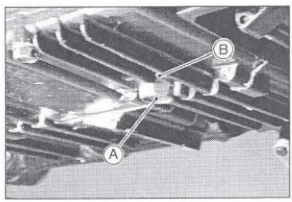
Item	Standard	Service Limit
Engine Oil:		
Type	API SE, SF, or SG	– – –
	API SH or SJ with JASO MA	
Viscosity	SAE10W-40	– – –
Capacity	2.7 L (when filter is not removed)	– – –
	2.9 L (when filter is removed)	– – –
	3.2 L (when engine is completely dry)	– – –
Oil Pump:		
Oil pump drive chain 20-link length	127.0 ~ 127.4 mm	128.9 mm
Oil Pressure Measurement:		
Oil pressure @4,000 r/min (rpm) oil temp. 100°C (212°F)	355 ~ 410 kPa (3.6 ~ 4.2 kgf/cm^2, 51 ~ 60 psi)	– – –

Special Tools - Oil Pressure Gauge, 10 kgf/cm^2: 27001–164
Oil Pressure Gauge Adapter, PT 1/8: 57001–1033
Oil Filter Wrench: 57001–1249

Sealant - Kawasaki Bond (Silicone sealant): 56019–120

Engine Oil and Oil Filter

Engine Oil Change



● Situate the motorcycle so that it is vertical after warming up the engine.
● Remove the engine drain plug [A] to drain the oil.
○ The oil in the oil filter can be drained by removing the filter (see Oil Filter Change).
★ Replace the drain plug gasket [B] with a new one if it is damaged.
● Tighten:

Torque - Engine Drain Plug: 20 N·m (2.0 kgf·m, 14.5 ft·lb)

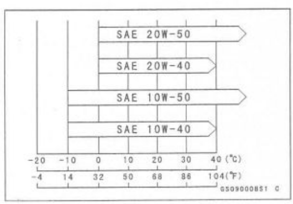
● Pour in the specified type and amount of oil.

Recommended Engine Oil

Type:	**API SE, SF, or SG**
	API SH or SJ with JASO MA
Viscosity:	**SAE 10W-40**
Service Limit:	**2.7 L (when filter is not removed)**
	2.9 L (when filter is removed)
	3.2 L (when engine is completely dry)

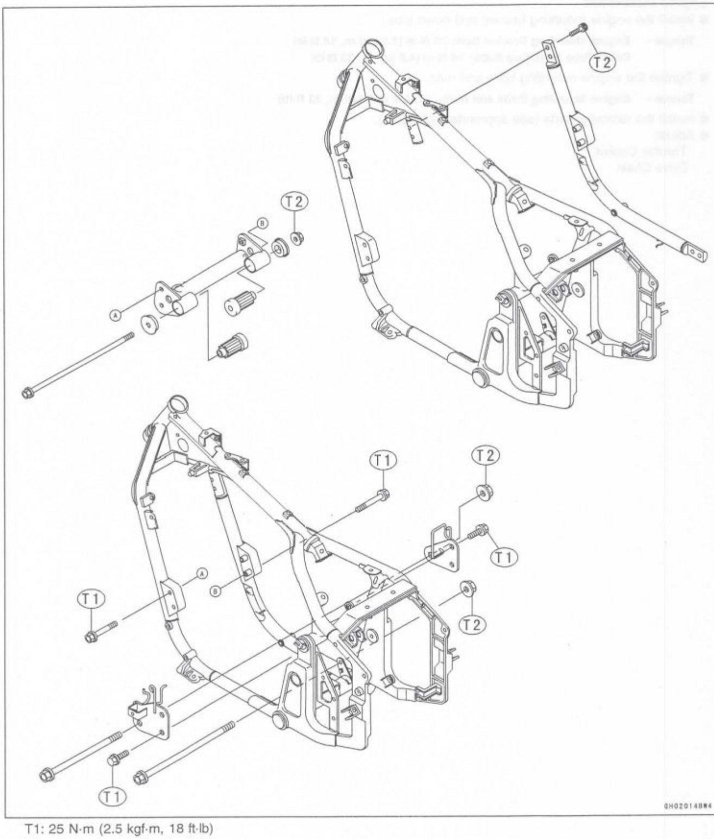
NOTE

○ *Depending on the atmospheric temperature of your riding area, the engine oil viscosity should be changed according to the chart.*



Engine Removal/Installation

Exploded View



T1: 25 N·m (2.5 kgf·m, 18 ft·lb)
T2: 44 N·m (4.5 kgf·m, 33 ft·lb)

Engine Removal/Installation

Engine Installation

- Install the engine mounting bracket and down tube.

  Torque - Engine Mounting Bracket Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)
  Down Tube Mounting Bolts: 44 N·m (4.5 kgf·m, 33 ft·lb)

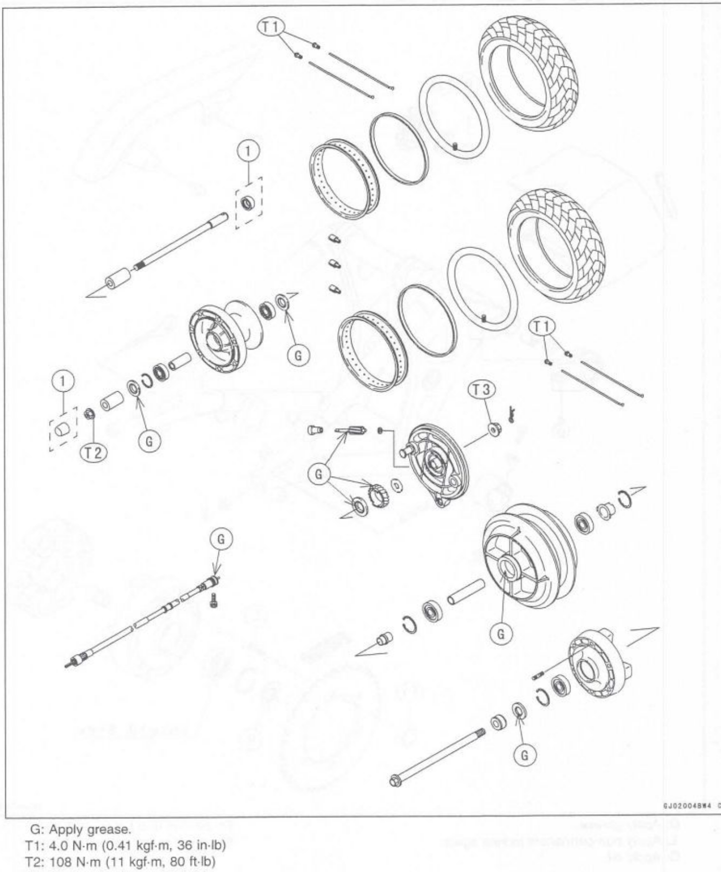
- Tighten the engine mounting bolts and nuts.

  Torque - Engine Mounting Bolts and Nuts: 44 N·m (4.5 kgf·m, 33 ft·lb)

- Install the removed parts (see appropriate chapters).
- Adjust:
  Throttle Cables
  Drive Chain

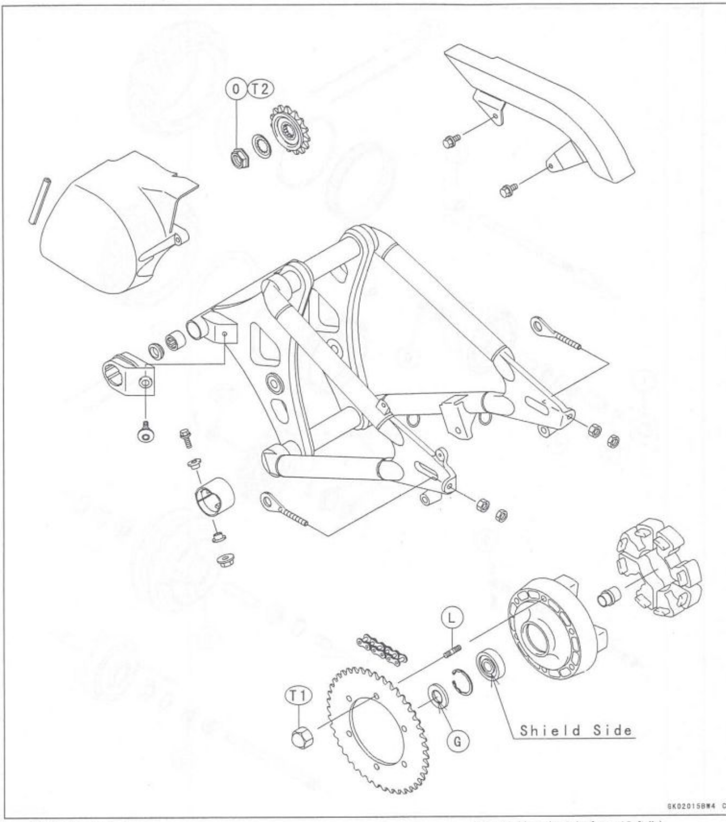
Wheels/Tires

Exploded View



G: Apply grease.
T1: 4.0 N·m (0.41 kgf·m, 36 in·lb)
T2: 108 N·m (11 kgf·m, 80 ft·lb)
T3: 98 N·m (10 kgf·m, 72 ft·lb)
1. European and U.K. Models

Exploded View



G: Apply grease.
L: Apply non-permanent locking agent.
O: Apply oil.

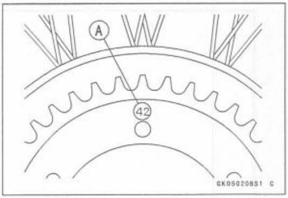
T1: 59 N·m (6.0 kgf·m, 43 ft·lb)
T2: 125 N·m (13 kgf·m, 94 ft·lb)

Final Drive

Sprocket, Coupling

Rear Sprocket Installation

● Install the sprocket facing the tooth number marking [A] outward.

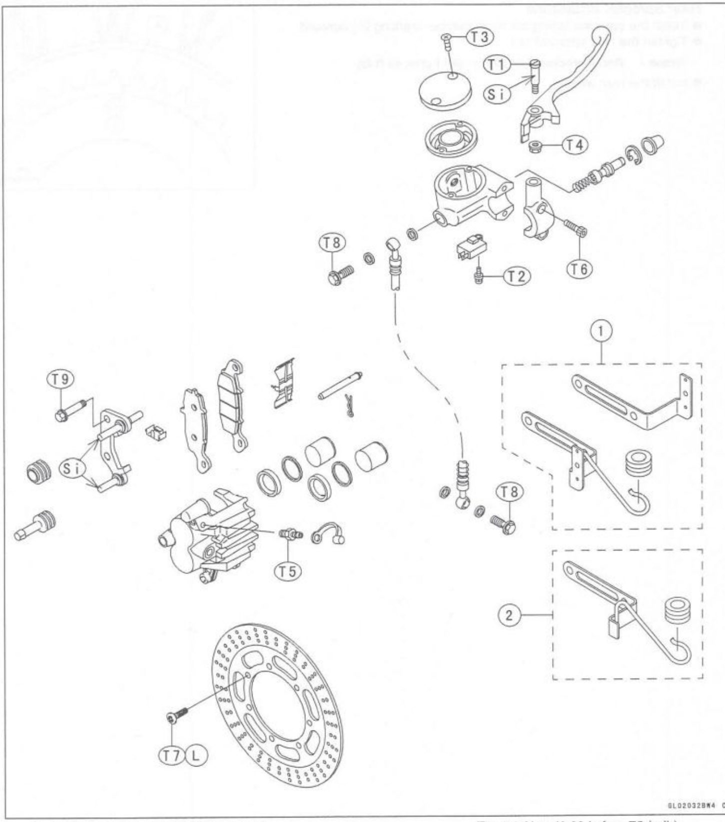


● Tighten the rear sprocket nut.

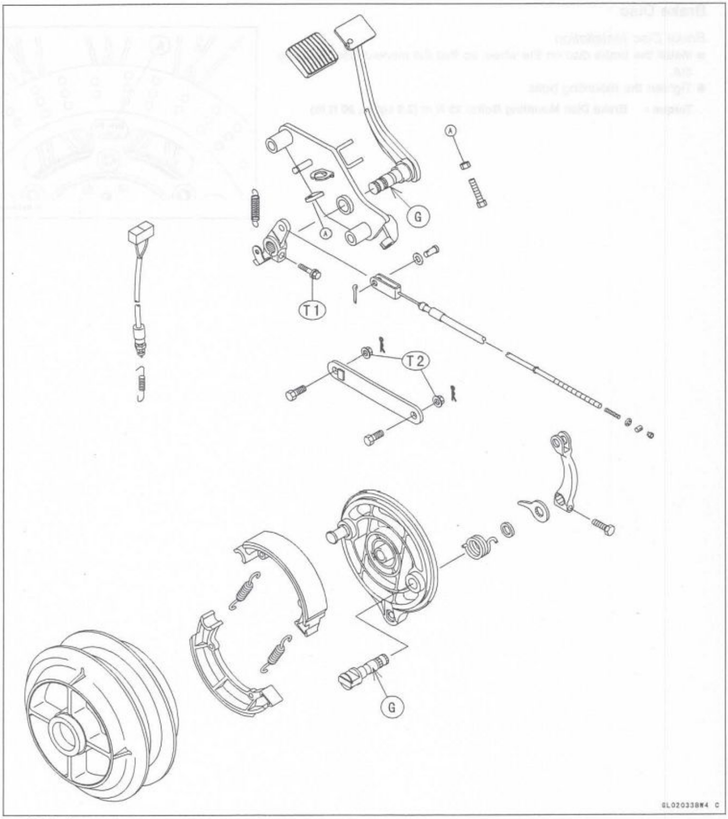
Torque - Rear Sprocket Nut: 59 N·m (6.0 kgf·m, 43 ft·lb)

● Install the rear wheel.

Exploded View



L: Apply non-permanent locking agent.
Si: Apply silicone grease.
T1: 1.0 N·m (0.10 kgf·m, 9 in·lb)
T2: 1.2 N·m (0.12 kgf·m, 10 in·lb)
T3: 1.5 N·m (0.15 kgf·m, 13 in·lb)
T4: 5.9 N·m (0.60 kgf·m, 52 in·lb)
T5: 7.8 N·m (0.80 kgf·m, 69 in·lb)
T6: 8.8 N·m (0.90 kgf·m, 78 in·lb)
T7: 27 N·m (2.8 kgf·m, 20 ft·lb)
T8: 25 N·m (2.5 kgf·m, 18 ft·lb)
T9: 34 N·m (3.5 kgf·m, 25 ft·lb)
1: U.S.A., California and Canadian Models
2: Other than U.S.A., California and Canadian models



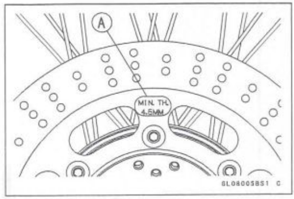
G: Apply grease.
T1: 25 N·m (2.6 kgf·m, 19 ft·lb)
T2: 34 N·m (3.5 kgf·m, 25 ft·lb)

Brake Disc

Brake Disc Installation

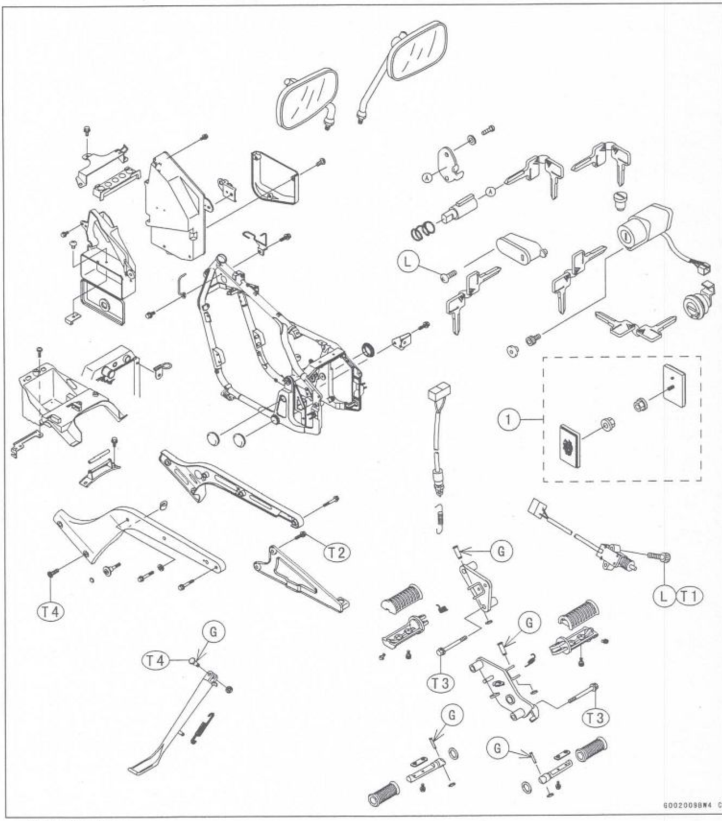
- Install the brake disc on the wheel so that the marked side [A] faces out.
- Tighten the mounting bolts.

Torque - Brake Disc Mounting Bolts: 25 N·m (2.8 kgf·m, 20 ft·lb)



Frame

Exploded View



G: Apply grease.
L: Apply non-permanent locking agent.
T1: 3.9 N·m (0.40 kgf·m, 35 in·lb)
T2: 25 N·m (2.6 kgf·m, 19 ft·lb)
T3: 34 N·m (3.5 kgf·m, 25 ft·lb)
T4: 44 N·m (4.5 kgf·m, 33 ft·lb)
1. U.S.A., California and Canadian Models

MODEL APPLICATION

Year	Model	Beginning Frame No.
1996	VN800-B1	JKBVNCB1□TA030001, VN800A-030001, or VN800B-000001 (Germany)
1997	VN800-B2	JKBVNCB1□VA050001, VN800A-050001, or VN800B-005001 (Germany)
1998	VN800-B3	JKBVNCB1□WA063001, JKBVNCB1□WB500005, VN800A-063001, or VN800B-008001 (Germany)
1999	VN800-B4	JKBVNCB1□XA075001, JKBVNCB1□XB502701, or JKBVN800ABA075001
2000	VN800-B5	JKBVN800ABA083001, JKBVNCB1□YA083001, or JKBVNCB1□YB506101
2001	VN800-B6	JKBVNCB1□IA089001, JKBVNCB1□IB509801, JKBVNCB1□IB089001, or JKBVN800ABA089001
2002	VN800-B7	JKBVNCB1□2A095001, JKBVNCB1□2B095001, or JKBVN800ABA095001,

□ : This digit in the frame number changes from one machine to another.

Kawasaki

Part No. 99924-1199-56